

AUTOMOTIVE INDUSTRIES


Volume 61
Number 17

PUBLISHED WEEKLY AT CHESTNUT AND 56TH STREETS
PHILADELPHIA, OCTOBER 26, 1929

35c a copy
\$3.00 a year

OCT 30 1929



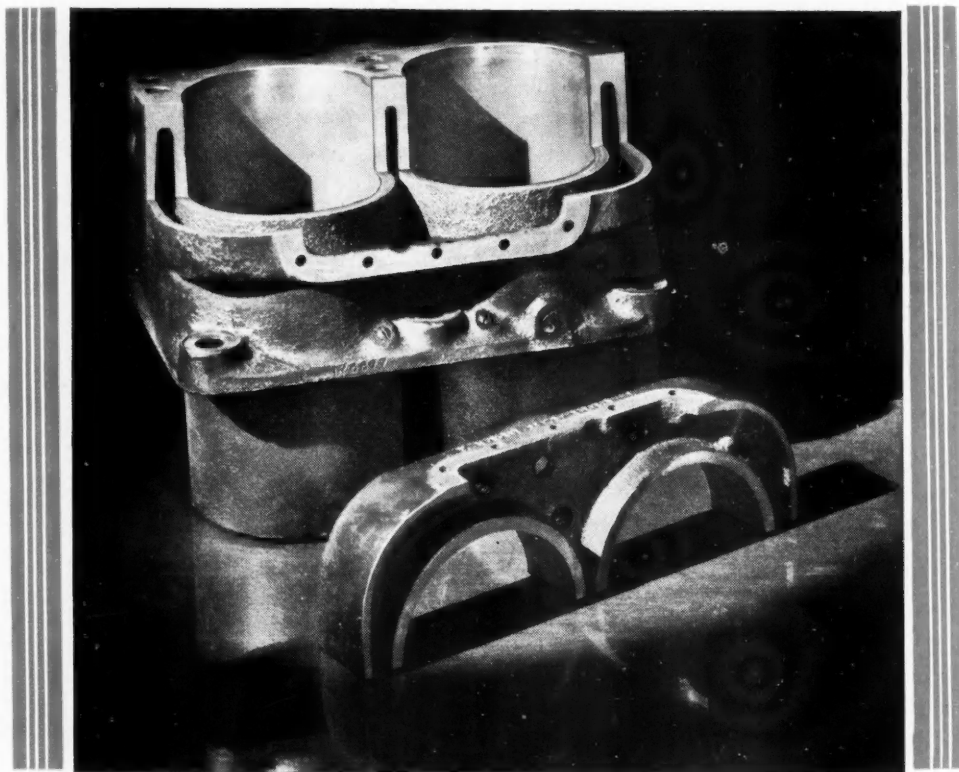
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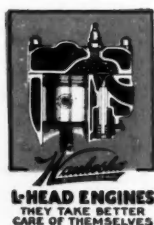
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AUTOMOTIVE INDUSTRIES

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Vol. 61

No. 17

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Automotive Industries is published every Saturday by
CHILTON CLASS JOURNAL COMPANY
Chestnut and 56th Streets, Philadelphia, Pa.

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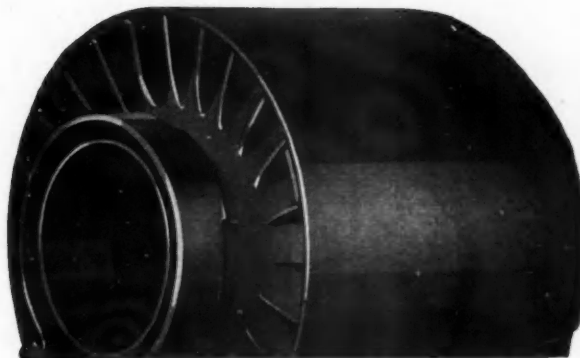
Controlled by United Business Publishers Inc., 239 West 39th Street, New York:
ANDREW C. PEARSON, Chairman, Board of Directors; FRITZ J. FRANK,
President; C. A. MUSSELMAN, Vice-President; F. C. STEVENS, Treasurer.

SUBSCRIPTION RATES: United States, Mexico, United States Possessions,
Canada and all countries in Postal Union, \$3.00 per year; Foreign, \$6.00 per year
Single Copies 35c.

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Automotive Industries — The Automobile is a consolidation of the Automobile
(monthly) and the Motor Review (weekly), May, 1902; Dealer and Repairman
(monthly), October, 1903; the Automobile Magazine (monthly), July, 1907, and the
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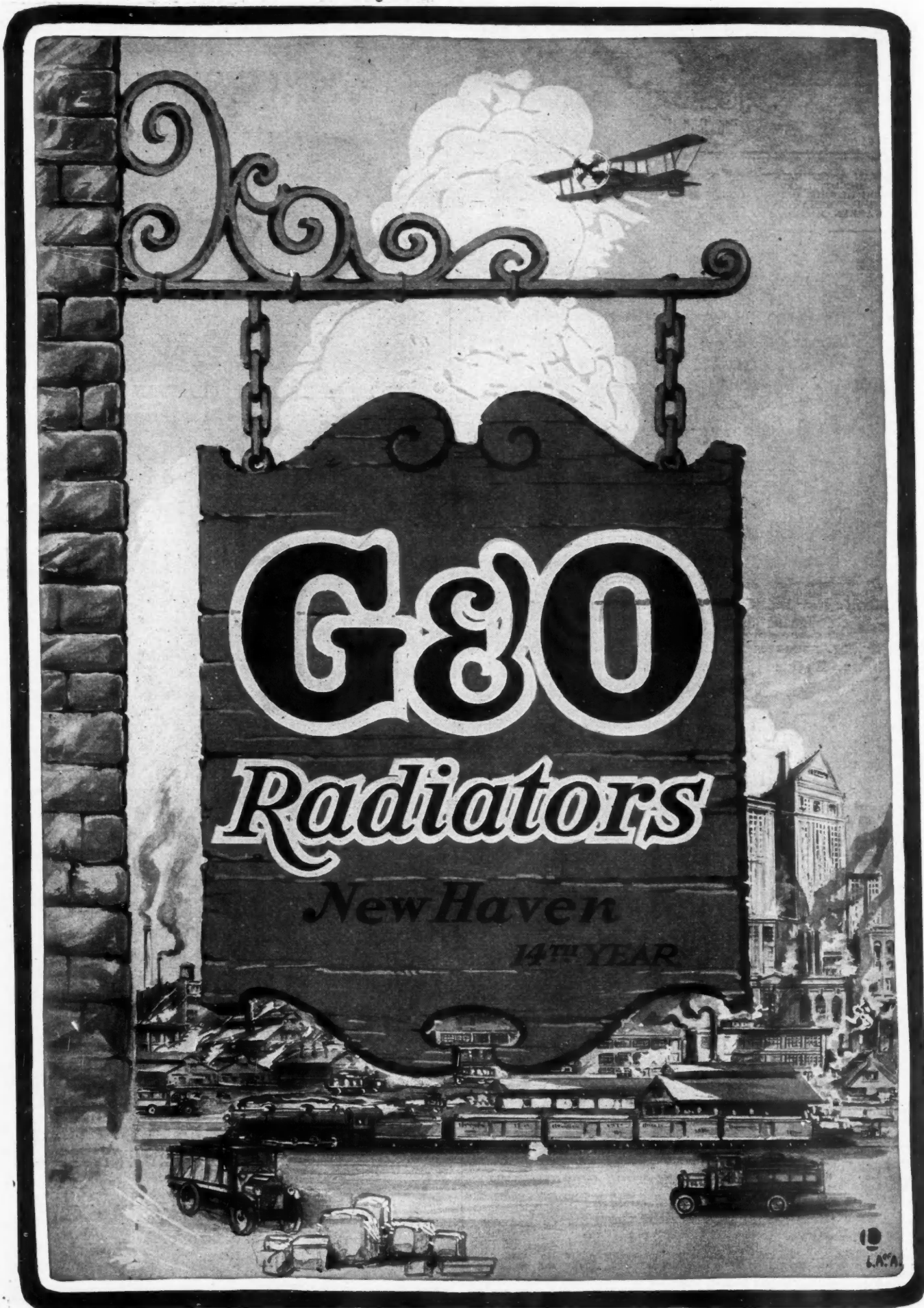
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A detailed black and white illustration for a radiator advertisement. The central focus is a large, dark, rectangular sign with a decorative top and bottom, hanging from a wrought-iron bracket by two chains. The sign features the word "GEO" in large, bold, stylized letters with a white outline, followed by "Radiators" in a cursive script, and "New Haven" and "14th Year" in smaller text below. The background of the illustration depicts a busy industrial scene. In the foreground, there are several vintage cars and trucks, including a delivery truck on the left and a car on the right. In the middle ground, a long train of freight cars is visible. The background shows a cityscape with various buildings, including a prominent tall building on the right, and smoke rising from industrial structures. A biplane is flying in the sky above the sign. The entire scene is framed by a decorative border on the left and top.

GEO
Radiators
New Haven
14th Year

10
L.A.A.

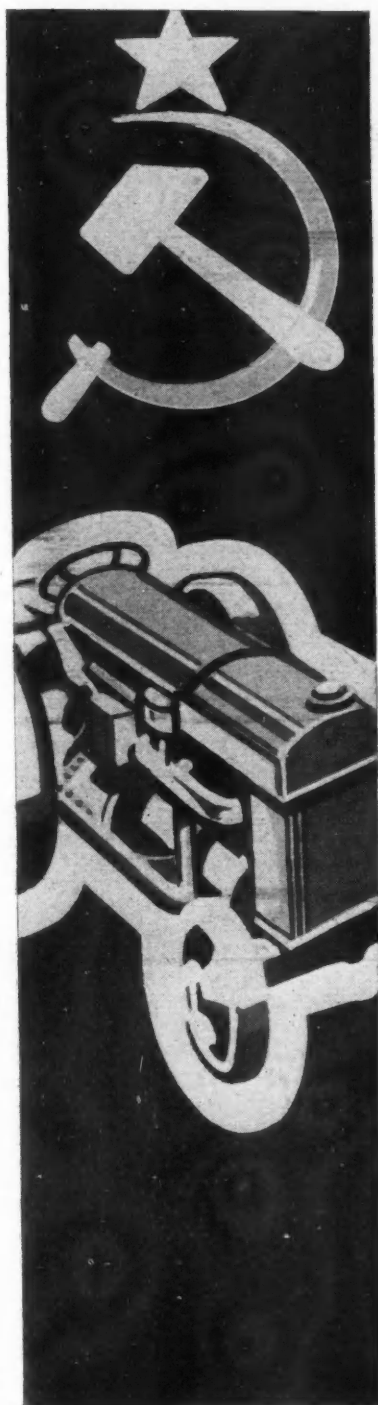
AUTOMOTIVE INDUSTRIES

VOLUME 61

Philadelphia, Saturday, October 26, 1929

NUMBER 17

Russia's New Motordom Must Serve Farmer



WHILE Congress and the parliaments of many other countries have been debating political theories and political stratagems involved in recognizing or in ignoring Russia as a nation, the Soviet regime has begun a renaissance of considerable magnitude, the automotive phase of which is discussed in an article on the following pages. It took fully seven years, however, for the leaders of the new government to get into motion the new economic program because of the chaos of the world and civil wars, and the necessary campaigning that has been needed to keep burning the flame of intense communism—upon which is based the entire economic structure of the Union of Socialist Soviet Republics, the area of which covers one-sixth of the surface of the earth.

Because agriculture is by far the most important industry of the country, the Soviet administration has considered manufacturing, banking and credits, transportation, commerce and even the standing army and navy adjuncts to farming, and the economic program to date serves as a corollary to farming. Therefore, the new automotive industry has been established to promote agriculture, and tractors and trucks will be built in large numbers as compared to automobiles.

The concession program of 1920 establishes the right of concessionaires to operate in the Soviet Union, and now protects them from confiscation or nationalization of property or capital investment, but provides for the hiring of all labor and other workers under the provision of the Soviet labor code.

Test cases in the highest courts of various interested countries, including the United States, have been brought to determine the legality of long-term credits between manufacturers and the Soviet importing trading corporations. In each case, approval was granted. These decisions have accelerated trading activity. In machine tools alone, the value of exports from this country to the Soviet Union increased more than 600 per cent for the year of 1928-1929 over the previous fiscal year.

Practically all phases of the economic development of Russia have had the advantage of the policy of the central government in sending engineers to other countries to study methods. This is particularly true in the automotive industry. Scores of foremen and engineers are now working in plants in this country, under orders of government bureaus, for the purpose of taking back with them ideas which can be applied to the industry in the far-flung domain of the Soviet Union.



Map of proposed Soviet automotive production area, showing plant locations and annual output figures

IF the present program adopted by the Soviet authorities in Russia works out as planned, and present indications are that it may even be surpassed, that country will be producing by the end of 1933 about 250,000 motor cars, trucks and tractors a year. The largest percentage of these will be tractors.

This program is being developed at present to meet such demand as exists and as will be growing during the next few years under the direction of the Avtotrest (auto trust) and the Avtostroy, an organization for the development of automotive factories. Both these bodies are official bodies of the Soviet government and their activities comprise a part of the five-year eco-

nomic program recently launched by the Soviet regime.

As a matter of fact, the automotive end of this program has outstripped its other phases and is now considerably ahead of its original schedule. Roughly, the program calls for plant facilities for the production of 250,000 units a year by the end of 1933. The bulk of this production will be in trucks and tractors, with an annual production of approximately 40,000 passenger cars.

As outlined by the Soviet officials, the automotive program is actually a phase of the agricultural development program at present being carried on by the Soviet.

SOVIET PRODUCTION

Automotive plans call for building and operating plants in Russia having an annual capacity output of 250,000 units, including cars and trucks, by the end of 1933.

By A. B. Crofoot

Agricultural development in Soviet Russia is being carried out along three lines, first by the large state grain farms which are being developed on comparatively uncultivated lands. One of these grain farms now has 130,000 acres under cultivation and utilizes 600 tractors. There are at pres-

ent 40 such farms in operation and the program calls for 110 similar farms by the end of the fiscal year ending Oct. 1, 1930. It is the policy of the government to have these farms mechanically operated as far as possible and to utilize horses only as mounts for the foremen. By the end of 1933 it is planned to have 15,000,000 acres under cultivation in these state grain farms. This branch alone of the agricultural program, it is estimated, will require more than 20,000 tractors.

The tractors used in these farms are powerful types, being bought at present from the Caterpillar Tractor Co. (Holt), Cleveland Tractor Co. (Cletrac), International Harvester Co. and John Deere. Between 7000 and 8000 such tractors have been purchased from the United States during the fiscal year just ended.

Next to the state grain farms come the collective farms which are owned and worked cooperatively by local groups. These farms, together with individual farms, both cooperative and private, are now using about 50,000 tractors and, as they develop further, it is expected that there will be a vast increase in demand for tractors for this field.

For the use of independent peasant farmers, there are being established now at scattered points throughout Russia 100 tractor service sections, at each of which are to be available from 50 to 100 tractors. These tractors will be rented out to the independent peasants for their use and are paid for out of the crops turned over to the Soviet. The tractor part of the present Russian automotive program, it is estimated, will fall far short of meeting the demand from these three farming groups.

To meet these demands there are in actual operation in Russia two tractor plants and one truck plant producing, at the present time, at the rate of 7000 tractors and 500 trucks a year. The tractor division of the Putilov plant in Leningrad, one of the oldest industrial organizations in the country, is now producing 500

Valery I. Meshlauk (left), vice-chairman of the Supreme Economic Council, U.S.S.R.; Henry Ford (center) and Saul G. Bron, chairman of the board of the Amtorg Trading Corp., at the time of the signing of the Ford "technical assistance" contract



tractors per month. This plant is being expanded so that next year it will produce 10,000 tractors. There is also a plant in operation in Kharkov, the capital of the Ukraine, now producing 1000 tractors a year. This plant is to be expanded to have a capacity of 5000 a year.

One Soviet official estimated that the tractors would require 200,000 cars and trucks to supply service that they need. Incidentally, Russia is probably the only country in the world where the tractors exceed the number of cars, the present ratio being approximately 50,000 tractors and 20,000 cars.

The truck end of the automotive industry is also being largely advanced by agricultural interests. The State Grain Trust has already filed a request for 1000 trucks for next year.

Moscow Plant Expanding

About 500 trucks a year are being produced in the Amo plant in Moscow. This plant is one of those in which American participation in development has been sought, and it is being expanded under plans projected by the Arthur J. Brandt Co. of Detroit and will have a capacity of 25,000 units per year, working on one shift. All new Russian plants, and many of the plants now in operation, will operate on a seven-hour shift and five and one-half working days per week, although the plants themselves will operate 360 days per year.

In addition to these plants which are now in operation and on which expansions are now being made, there are a number of new plants now under construction, with still more projected. Of foremost interest to the American industry is the Nijni Novgorod plant in which the Ford Motor Co. is participating. This plant is to have a capacity of 100,000 units a year, about 60 per cent of which will be light trucks, the remainder being passenger cars. This plant is now actually under way on a site 15 miles out from Nijni Novgorod.

Another plant now under way is the tractor plant at Stalingrad, which was projected two years ago, to have an annual capacity of 10,000 per year, but which has already been increased so that by the time it is completed next year it will have a capacity of 40,000 units a year.

Two more plants now projected but not actually under way are a tractor plant at Chetyabinsk in the Ural Mountains, which will have a capacity of 30,000 units a year and a truck plant at Yaroslav which is to have a capacity of 20,000 units a year. There are also plans under consideration for the erection of two more tractor plants at points not yet determined. One of these will be for extremely light tractors and the other for heavy tractors. These two projects are still in the discussion stage and no details as to capacity and so on are as yet available.

As was mentioned above, the Nijni Novgorod plant is to manufacture trucks of light weight, along the lines of Ford trucks. The Amo plant will manufacture trucks of medium capacity and the Yaroslav plant will turn out heavy duty trucks.

American participation has been secured for the Yaroslav factory from the Hercules Motors Corp., which is assisting in the erection of the engine plant for those trucks to be manufactured here. At present the above list comprises all those in which American participation in the form of technical assistance contracts have been secured. It seems fairly definite, however, that other American car manufacturers are studying the situation very seriously, with a view

to entering into similar contracts with the Soviet.

A Swiss company manufacturing ignition equipment has received a contract similar to the Ford and Hercules contracts for the erection of an ignition equipment plant within the Russian borders.

It is part of the Soviet plan that all parts and equipment shall be manufactured locally. These automotive plants will be complete units, therefore, and the products, even though of American design, will be 100 per cent Russian products. The Soviet does purchase from abroad production machinery, but it is trying to do away, as far as possible, with buying finished products from any foreign country. These plants, therefore, are being equipped with foreign machine tools, mostly from America, some from Germany and some from other countries, but insofar as possible no part of the finished car, truck or tractor is to be imported.

As a matter of fact, the Stalingrad plant has already ordered from America \$4,000,000 worth of machine tools and equipment for putting it in shape to meet its production schedule. Total purchases last year by the Amtorg Trading Corp., the Soviet's official purchasing body, amounted to \$7,500,000 worth of automotive equipment from America. This is nearly three times the amount of automotive equipment purchased during the previous year.

The plan for foreign participation involves almost entirely the engineering phases. The Ford contract, for example, calls for the participation of Ford engineers in the erection of the Nijni Novgorod plant and the making available of all Ford designs for use in this plant. In the interim, also, a group of Soviet engineers is in this country working in the Ford plant and studying American methods so that it will be available for supervisory positions when the Nijni Novgorod plant gets into operation. The contract calls for the erection of the plant within three years and extends for a further six years, during which there is to be a reciprocal arrangement whereby any improvements in design developed by Ford are to be available for the Soviet factory, and any improvements developed by Soviet engineers will be available for Ford.

Ford's \$30,000,000 Contract

During the erection of this plant the contract further calls for the purchase by the Soviet of 72,000 stripped chassis from Ford, delivery of the last to be made by the time the factory is completed. This order involves approximately \$30,000,000. So far as has been announced, Ford is to receive no other direct financial return for this contract.

While the details of the Hercules contract for the erection of the engine plant at Yaroslav have not yet been revealed, this contract is similar in its scope to the Ford contract. There is also a similar contract between the Soviet and the Seiberling Rubber Co. who are to assist in the erection of a tire factory at Yaroslav, which is to have a capacity of 3100 automobile tires, 9000 bicycle tires and 480 motorcycle tires per day, seven-hour shift. A. J. Brandt, in his participation in the Amo factory, is acting as a consulting engineer just as would be the case in any plant being erected in this country.

In all contracts, whether the Soviet is seeking foreign participation in the establishment of plants within its borders, or is merely purchasing products from manufacturers here, the contracts of purchase

(Continued on page 614)

All New British Models Are Sixes At the Olympia Show

English manufacturers seem determined to increase exports with designs conforming to both domestic and foreign requirements and cooperative overseas sales and service.

By M. W. BOURDON

(Special Cable to Automotive Industries)

THE Twenty-third Annual Motor Show at Olympia, which opened in London on Oct. 17, fully maintained its international character, there being 517 exhibitors, including 61 body builders and 370 exhibitors of accessories and parts. Among the makes shown were 34 British, 24 American, 20 French, 7 Italian, 3 Belgian, 2 German, 1 Austrian and 1 Spanish.

American makes included Auburn, Buick, Cadillac, Chevrolet, Chrysler, De Soto, Dodge, Duesenberg, Essex, Franklin, Graham-Paige, Hudson, Hupmobile, LaSalle, Marmon, Marquette, Moon, Nash, Overland, Packard, Reo, Studebaker, Stutz, Willys-Knight.

Car manufacturers' exhibits totaled 10 less than last year. The attendance was down for the first two days, but not enough to suggest a serious reduction in public interest. Optimism prevailed generally concerning 1930 sales. The majority of makers and dealers professed to anticipate a record year if no industrial unrest arises and the import duty is maintained. British makers showed greater determination to increase export trade. The plan of cooperative sales and service overseas is extending. Some new models have been conceived with careful thought of export as well as home requirements. The feeling prevails that offerings of new light sixes will cause a considerable section of the buying public

to accept larger cars than the fours previously favored, especially as the prices are similar. This will tend to raise the demand at home to the level of the export demand (which has been so different hitherto), thus justifying bigger production schedules, with consequent lower prices for overseas.

British makers in effect are trying to educate a big class of home buyers to accept a type of car that fulfills a large proportion of the demands of the foreign buyer. Judging by the response to date, the success of this plan is assured. Prospects in this class appear willing to sacrifice some economy in tax, insurance and fuel to secure the benefits of the new sixes, but comparatively few will go beyond the £16 tax rating, implying a 2½-in. bore.

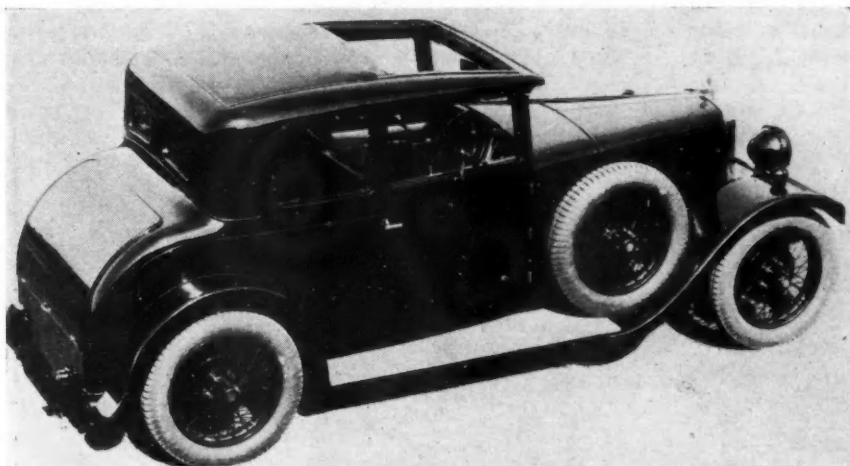
The outstanding feature of the Show was that all new British models were sixes, the smallest being of 100 cu. in. displacement and the largest (with the exception of the Rolls-Royce 40), 250 cu. in. Taking all British cars for 1930, all sizes under 85 cu. in. have four cylinders, while above that displacement all are sixes, except two fours and five eights. Only one manufacturer of eights has an output of more than 10 cars weekly. Sunbeam has discontinued two eights. Most makers assert that there is no appreciable demand for eights, irrespec-

tive of size or price. Daimler alone has a 12-cylinder model. As at the Show last year, the principal demand appears to be for ultra-economy types rated at 7 hp., or of about 60 cu. in. displacement.

The new Morris 140 cu. in. and the Singer 126 cu. in. sixes, displacing former fours, are the most notable models this year, prices bringing them within the sphere of the big demand. The Singer is now the cheapest British six, at £240 for the roadster and £275 for the metal sedan, as compared with the Morris phaeton at £275, fabric sedan at £285 and metal sedan at £299.

Armstrong-Siddeley has the smallest six, with 86 cu. in. displacement, 105-in. wheelbase and 48-in. track. It is priced at £285 for the sedan.

Last year only the Singer cars had chromium plating, while this year



Six-cylinder Star sports coupe, with sliding roof, rated at 18 to 50 hp., which was exhibited at the twenty-third annual Motor Show held at Olympia in London, Oct. 17 to 26

nearly all makers use it, the principal exceptions being those of expensive cars. Safety glass, hitherto extra, is now used on nearly all makes, even the cheapest, though prices are sometimes increased thereby. Centralized chassis lubricating systems have been adopted widely, although types of installations vary considerably, ranging from one-shot complete lubrication, to a few accessible nipples, each with leads to several bearings. Oilless bearings, and especially the Silentblobs, are in much wider use for springs, so that the centralized lubricating systems are simplified.

The show at Olympia gave no indications of a definite trend toward either fabric or metal body work. Some manufacturers who specialized in one last year are now concentrating on the other. The evidence points to the fact that practically all makers feel compelled to offer both, though Singer has dropped the fabric type.

Nearly all makes of cars are shown or offered with sports coupe bodywork, for which a big demand exists. This type is now developing into the four-passenger close-coupled sedan with integral rear luggage locker. It generally has four lights, but still only two wide doors, although Hillman, who introduced this type, shows four-door models.

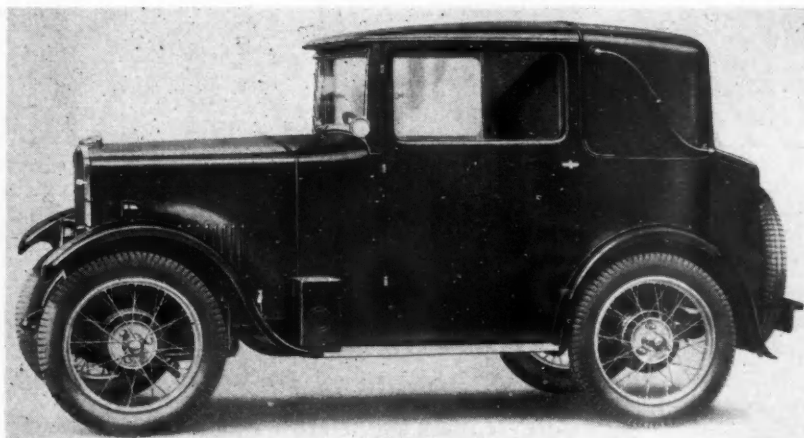
Metal sports coupes have made their first appearance, although the majority are still fabric. Weymann construction is now almost universal for fabric bodies, unless, as is sometimes done, the body is flexibly mounted. Several new fabric sedans have opposed equal angles for the windshield and the rear panel, the slope being 10 to 15 deg.; Lea-Francis has gone even farther, and inclined the radiator to the same degree.

The majority of makers offer "sunshine roofs," with a folding or sliding half-section. Last year's involved arrangements, giving a completely open roof, have been discarded for standard sized bodies, although many custom body builders show new schemes for the complete conversion of closed into open models.

Few phaetons were exhibited, and those that were shown were mainly speed models, with low sides, low seats, specially tuned engine and higher gears. Metal sedans show very slight differences, though waistlines are brought into prominence frequently by chrome beading inclosing a distinct color panel. Two makers, Triumph and Swift, have adopted a narrow radiator shell. Armstrong-Siddeley radiators are colored to match the body and have plated edges.

The use of cam steering has increased notably. Two more makers, including Morris, use Lockheed brakes. Vacuum servo brakes have been added to only two new models. Bendix duo servo brakes are finding favor. Brake equalizers are fast disappearing.

Eighteen new British models were shown at Olympia, 11 of these being based on previous types. These include the Rolls-Royce 20 and 40. Rover continues the 122 cu. in. six, but uses the same engine in a new



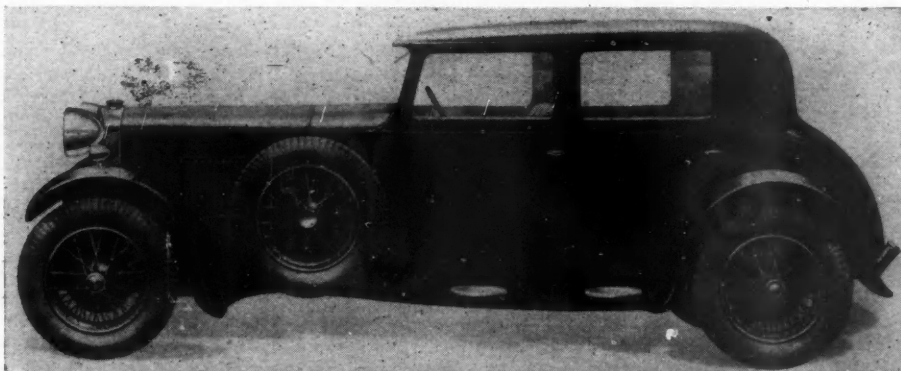
The Triumph "Super Seven" landaulet was one of the ultra-economy types of cars exhibited at Olympia. It is powered by a 7 hp. engine, as the name implies, and will seat two adults. It is priced at £197

light chassis with shorter wheelbase. A new light six Riley has the 114 cu. in. engine of the larger six, in a chassis of the same size as that of the 67 cu. in. four. Humber has redesigned its 147-in. six chassis, which is offered also with a 245 cu. in. engine. Daimler's new 245 cu. in. sleeve-valve six, designed by Pomeroy, has an aluminum cylinder block without liners, and a duralumin front axle, while alloys are also being used extensively elsewhere. An oil cooler is incorporated in the radiator of this model. Sunbeam, like Rolls-Royce, has discarded cantilever springs for half-elliptics, and uses an oil cooler between the front spring horns.

Only two new British models now have simple magneto ignition. Overhead-valve engines exceed the L-head type in number, though for popular priced cars the general trend is toward the L-head construction.

The pump type of carburetor has found new adherents, although some makers who used it hitherto, have reverted to the simpler Solex or Zenith carburetors. Several manufacturers have adopted the mechanical fuel pump. Three British cars have four-speed transmissions with a silent third. Internal gears of the Warner type are not used. Armstrong-Siddeley continues the Wilson self-changing planetary gearset on the largest models at extra cost. No new British cars with front-drive or independent spring suspension were shown.

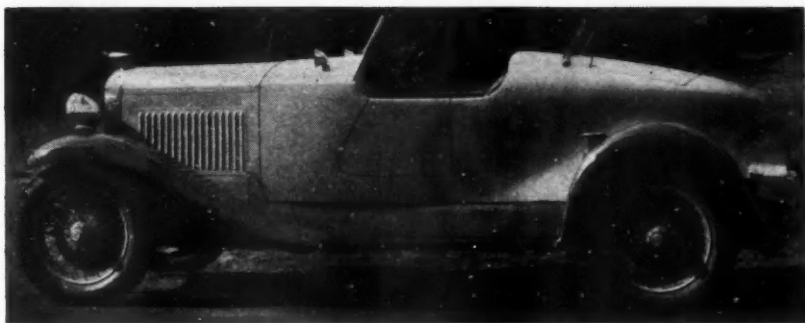
Armstrong-Siddeley is concentrating on a six-cylinder program with four sizes, viz., 12 hp. (73 cu. in.), 15 hp. (116 cu. in.), 20 hp. (170 cu. in.), and 30 hp. (305 cu. in.). The Twelve is the smallest six-cylinder car



The Sunbeam Six was shown with a Weymann sedan body. It has a sliding roof section, step plates instead of the conventional running boards and unusual treatment of fenders. The rear deck is equipped as a special luggage carrier with three fitted suit cases

on the British market; with a wheelbase of 105 in. and a track of 48 in., it is offered with four-passenger phaeton and fabric sedan bodies at £250 and £285 respectively. Like the 15 hp. model, it has side valves, though the two larger models have pushrod-operated overhead valves. A special feature of the Armstrong-Siddeley program is the offer, at extra cost, of the four-speed "self-changing" gearset introduced 12 months ago with the 20 hp. and 30 hp. models. This gear, it may be recalled, is on the Wilson system, in which planetary trains are brought into use by first moving a finger lever over the steering wheel to the required point and then depressing the clutch pedal when the actual change of ratio is needed. All Armstrong-Siddeley cars now have a distinctive radiator finish; the shell is finished to match the color of the body but has chrome-plated beadings at the front and rear edges.

Austin introduces no new chassis models, though additional body styles are included in every line. Chassis models comprise the Seven and Twelve (both fours) and the Sixteen and Twenty sixes. Numerous detail changes have been made. Chrome plating is standard and Triplex glass is used for all windshields and for the windows of sedans. On the Twelve and Sixteen the control lever of the four-speed gearset now moves in a spherical bearing instead of sliding through a gate; the reverse position is guarded by reason of the fact that the lever must be lifted as well as moved laterally



Hurlingham sports roadster, an addition to the Vauxhall line of 20-60 hp. sizes, has a special high efficiency engine and higher gear ratios than the standard models. It is priced at £650

through neutral to the right of the third and fourth speed positions before it can be brought back into reverse. Gas and ignition controls are placed at the head of the steering column in a Bakelite fitting. Dip-and-switch headlamps are standard on the Sixteen and Twenty. All models except the Seven now have Silentbloc (rubber sleeve) bushes for the springs and the frames of the Twelve and Sixteen have been lowered. Prices are practically unchanged, though the Seven is £5 higher at £130 for the two-four-seated open model and at £140 for the fabric and metal sedans and coupe. The sedans on the Twelve and Sixteen are offered optionally with a sliding roof for £10 extra, but this feature is standard on the Seven.

Bentley cars show variation in detail only, the most notable change being the provision of a supercharger on the 275 cu. in. four-cylinder speed model. A Roots blower type is used, located under the radiator and driven by gearing from the front end of the crankshaft.

The new 25 hp. six-cylinder steel sleeve valve Daimler designed by L. H. Pomeroy makes its first public appearance. This new model, with an engine of 213 cu. in.

piston displacement is notable on account of the extensive use of aluminum alloys, notably for the whole of the engine "casing" (cylinder block, cylinder head, crankcase and sump) and the front axle. It is the next to smallest chassis of a range of five models, of which three are Sixes (20 hp., 25 hp. and 35 hp.) and two Twelves; the latter are of 229 and 433 cu. in. capacity, are rated at 30 hp. and 50 hp., and have two rows of cylinders set at an angle of 60 deg. on the common crankcase. The new 25 hp. is intended for five-passenger bodies and is designed to appeal primarily to the owner-driver; for larger and chauffeur-driven bodywork a long wheelbase model is offered, which has the aluminum engine but otherwise is the same as the 1929 model of this power. Typical prices of the 1930 line are: 20 hp. sedans from £695; 25 hp. sedans from £1,020 (chassis only £700 with 133-in. wheelbase or £750 with 143-in. wheelbase). The double-six Thirty is £1,050 for the chassis and the Fifty, £1,950.

Hillman is again concentrating on the 158 cu. in. overhead valve eight-cylinder chassis introduced 12 months ago, and the 116 cu. in. side-valve four-cylinder which has been current for several years past and shows no signs of falling off in popularity; further extensions of the Coventry plant have been made to secure a bigger output of both models in 1930. Only modifications of detail have been embodied in both chassis, such as the use of Silentbloc bushes for the springs, stronger frames, and the new steering wheels with ignition, gas and dipping headlamp controls arranged in a Bakelite center. A complete change has been made in the design of the engine hood; it is now of three separate pieces, of which the central section hinges back on either of the vertical sides. For that purpose a special form of hinge has been devised, two being fitted at each side. To gain access to one side of the engine the screw locks of the hinges on that side are released to free the central section, which then can be hinged over to the opposite side. A drawback is that before the second side can be opened the central section must be shut down and the hinge screws on the first side tightened. Alternatively, the

central section and the two side panels can be removed entire. The principal advantage of this new hood seems to be its neat appearance and the rigidity with which the three sections are held down in place when fixed for running.

As in the case of the 1929 Hillmans, precisely the same bodies fit both the four-cylinder and eight-cylinder chassis, the body space on the two being identical. Numerous important changes have been made in the bodywork. The "Segrave" fabric coupe, originally a close-coupled sedan with a very wide door at each side, now has four doors, giving an additional window at each side of the rear seat. A drophead coupe has been added to the line; this has a double-seated dickey behind the folding head (the latter covered with light colored twill), and the lid that forms the backrest of the seat is opened by a spring when a lever inside the car is operated. The Eight is now offered as a sedan at £445 (£485 heretofore), this being the "safety" model with vacuum servo braking, safety glass, bumpers, etc. Sliding roofs are offered on the sedans at £10 extra. The four-cylinder sedan is now £325, or £375 as a "safety" model.

One of the oldest firms in the British motor industry and reckoned among the most conservative hitherto, the

Humber Company, has embarked on a new and progressive policy with a view to securing a greatly increased export trade, while retaining its share of the home market. To that end a new chassis has been introduced designed to accommodate two engine sizes without variation of wheelbase or hood length. For the home market primarily, though for export if required, the chassis has a six-cylinder 16-50 hp. engine (129 cu. in.); for export or for home buyers if desired, a 25-72 hp. engine, also with six cylinders, with a piston displacement of 213 cu. in., is offered. The large engine is lighter in relation to its size than the other owing to the crankcase being of aluminum, and as a result the chassis weighs only about 50 lb. more than when the smaller engine is fitted. Bodywork is interchangeable, and the only differences in the chassis are a higher radiator for the large engine, a larger clutch and propeller shaft and higher gear ratios. As can be imagined, the "25" has an outstanding road performance, for the "16" is no mean performer; acceleration of the former from 10-30 m.p.h. occupies under 9 sec., and of the latter under 12 sec., the maximum speeds being just under 80 and 70 m.p.h. respectively with a phaeton body.

Humber's New Prices Surprise

Humbers always have been recognized as high grade cars, so the new prices created considerable surprise. Examples are: Sixteen phaeton from £410, sedans from £435; Twenty-five phaeton from £495, sedans from £535. At a press gathering at which these cars were announced prior to the Show it was said that in India, for example, the 25 hp. models would be sold at £20 less than the nearest American competitor, and at corresponding prices in other British Dominions.

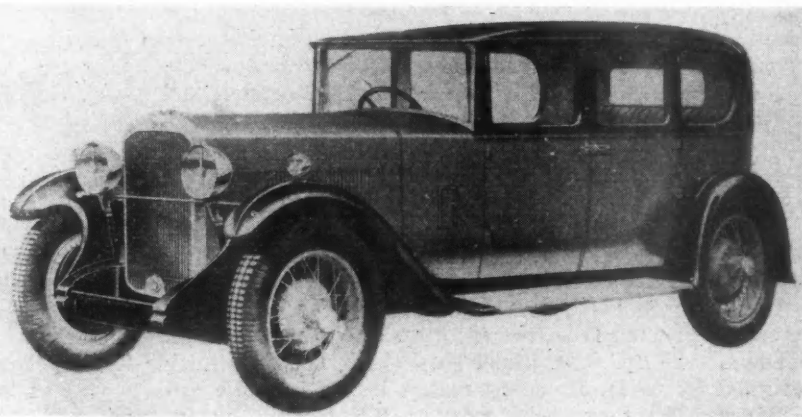
The chassis for both engines has a four-speed unit gearset with helical gears for the third speed, which render it more nearly quiet; the helical gears are in constant mesh (the driven pair running freely while the other ratios are in use) and brought into effect by a special type of dog clutch with semi-circular teeth viewed end-on providing engagement with peculiar ease; a double shifter-fork moves this dog clutch in unison with the sliding member that affords the direct high gear. The driving helical gears form the constant mesh drive for the second, first and reverse speeds. Bendix duo servo brakes, 14 in. in diameter and 2 in. wide, are fitted. Thermostatic radiator shutters are provided; ignition is by a battery system with automatic timing; steering is by Marles cam gear with a 36-ft. turning circle, the wheelbase being 120 in. and the track 56 in. The engine in each case has side exhausts and overhead inlets; the Sixteen with a compression ratio of 5.6 and a bore and stroke of 2.56 by 4.18 in. develops 50 b.hp. at 3600 r.p.m., but will exceed 4000 r.p.m. without appreciable drop in the torque curve; the Twenty-five has a 5 to 1 compression ratio, a bore and stroke of 3.16 by 4.57 in. and develops 72 b.hp. at 3200 r.p.m., but will, like the other, exceed 4000 r.p.m. The four-point mounting in the main frame has rubber bushings at the rear and metal bushings in front. Springs are

half-elliptic, 50 in. long at the back; front end shackling with Silentbloc bushings is used for the front springs. Chrome plating is standard. The engine hood is unusual in having two hinges at the top between 4 and 5 in. apart, which permits both sides to be open at once if required. In addition to the grouped levers for gas, ignition and lighting over the 17-in. steering wheel center, a central button sounds the horn when depressed and operates the engine starter through a solenoid when lifted.

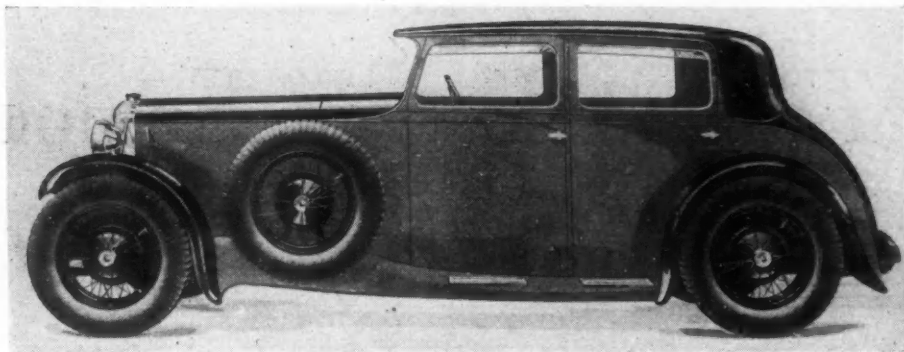
Morris, still the largest producer of passenger cars in England, has added two Sixes, one of which is already assured of a big demand in Great Britain, for it is of the size and type that appeals to one of the biggest class of car buyers in the home market. It is the 15 hp. 122 cu. in. side-valve model with a fabric sedan body with six lights, four doors and an integral rear luggage locker. It is offered also with a metal sedan body, including chrome plating and Triplex glass in both cases. Thermostatically controlled radiator shutters are fitted and Lockheed braking, hydraulic shock absorbers and a combined carburetor air heater, fume extractor and crankcase breather. The other new Six is the Isis described in *Automotive Industries* of Aug. 24 last; this, it may be recalled, is designed primarily for export. The Morris Cowley Four (95 cu. in.) is continued with improved bodywork, the sedan being £200 with folding roof; in the 7 hp. Morris Minor (52 cu. in.) line a metal sedan at £149 supplements the fabric type at £140, the latter representing an increase of £5, accounted for by the adoption of Triplex glass and chrome plating.

Rolls-Royce Has Larger Bore

Rolls-Royce is introducing two new, or considerably revised, models, for besides the new 40-50 hp. chassis, of which illustrated particulars were given in *Automotive Industries* of Oct. 19, a new series of the 20 hp. chassis was announced two days before the opening of the Show. The engine of the new Twenty has a larger bore, viz., 3¼ in. instead of 3 in., though the stroke is unchanged at 4½. The increase of power due to the larger bore is supplemented by the adoption of a turbulent cylinder head with overhead pushrod-operated valves; the inlets are of larger diameter and a larger carburetor and induction tract are used. As on the Forty, a separate carburetor is provided for starting with a change-over control on the instrument board; mixture adjustment for the main carburetor is also provided above the steering wheel center. Ignition is by battery system, with an idle magneto in reserve using the same distributor; to bring the magneto into use the high-tension leads to the distributor are changed



The Humber Six was shown at Olympia with a metal sedan body. An option of two engines, one of 25-72 hp. and the other of 16-50 hp., was offered at £535 and £435 respectively



A Daimler 25 hp. model with the Weymann fabric sedan body was exhibited at Olympia. Note the treatment of fenders

over and the magneto drive is connected up by means of a finger-operated coupling. The same set of spark plugs is used for both ignitions. The four-speed gearset is a unit with the engine and has side control; it has been redesigned to cope with the increased engine power, and so also have the propeller shaft and rear axle. The frame is lower by 2 in. than that of the old model by the half-elliptic springs having less camber without reducing frame clearance and by a smaller wheel size. Radiator shutters are fitted with hand operation, a distant reading thermometer on the instrument board and a red light that glows when the water approaches the boiling point. A semi-centralized chassis lubrication system is provided; a pedal-operated pump on the one-shot principle delivers oil to all chassis bearings above the springs, while on each axle is an oil gun nipple with leads to the unsprung parts. No flexible tubing is used, but throughout the oil is conveyed in solid drawn brass pipes rigidly secured in place. This lubricating scheme is the same as that on the new Forty, except that the oil feed is not extended to the spring leaves in the smaller model. Pedal braking is by mechanical servo operation as hitherto, with a separate set of shoes in the rear drums for hand actuation. The rear axle ratio (helical bevels) is 4.5 to 1, giving a maximum speed of 65-70 m.p.h. Steering is by screw and nut; fuel feed by Autovac without the vacuum pump of the new "40." The wheelbase is 129 in. and the track 56 in.

Rover is Practically Unchanged

Continuing the four-cylinder 10 hp. (73 cu. in.) model practically unchanged, Rover is now using the 122 cu. in. six-cylinder engine in three lengths of chassis, one of which, the shortest, is of lighter construction than the others to give a better road performance with smaller bodywork. This short type has a three-speed gearset; so has the medium length chassis, but with the latter a four-speed box is offered for £7 extra; on the long model four speeds are standard. The long chassis (130-in. wheelbase) is offered with only one style of body, a seven-seated limousine, while the Light Six is finished only as a sportsman's saloon, its body following the lines of that described in *Automotive Industries* of Aug. 31.

The range of Standard cars is confined again to a 9 hp. Four (73 cu. in.), with prices ranging from £185 for the fabric sedans with sliding roof, and a 15 hp. Six. The latter has been enlarged and redesigned in many details. It has side valves, a bore and stroke of 2.58 by 4 in. (125 cu. in.), battery ignition, A.C. mechanical fuel pump, spiral-bevel axle in place of the worm drive associated with this make for over 20 years past, and Silentbloc bushes for all spring pins.

The Singer program for 1930 consists of the 8 hp.

rear luggage space the new Six is £275. This new Six again brings Singer and Morris into direct competition with models of similar size and price.

Like Morris again, Singer has departed from overhead valves in designing this new Six, reverting to an L-head of the turbulent type; the bore and stroke are 2.56 by 3.54 in., three speeds with central control are fitted, the ratios being 5.22, 9.9 and 17.15 to 1. Hotchkiss drive, metallic universals, spiral bevels, semi-floating axle, half-elliptic springs with hydraulic shock absorbers, battery ignition with automatic control and mechanically operated four-wheel brakes are included in the specifications. The crankshaft has four bearings with a vibration damper in front. Wire wheels are standard with 29 x 5-in. tires. Steering is by screw and nut; fuel feed by gravity. The sedan has six lights, chrome plating, Triplex glass, bumpers, ventilating louvers and rain deflectors over the doors.

Singer Super-Six Improved

The other Singer Six (known as the Super Six) is an improved edition of last year's model, with overhead valves and a displacement of 117 cu. in.; it has four speeds, Marles cam steering, vacuum servo brakes, one-shot chassis lubrication and two spare wheels with 30 x 5-in. tires; as a metal sedan its price is £350.

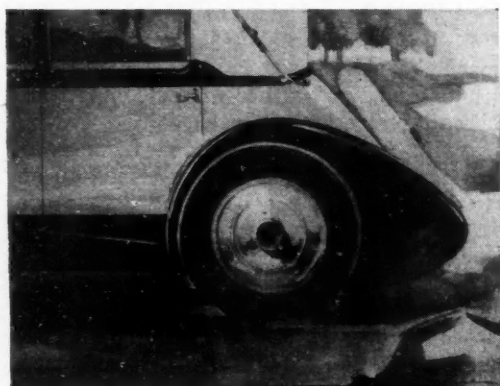
Sunbeam cars for 1930 are all sixes, the eights having been discontinued. There are four distinct chassis, the 16 hp., 20 hp., 25 hp. and 183 cu. in. sports. These are all continued models with detail changes only. The most notable changes are the provision of an oil cooler on the 20 hp. chassis, which gives a reduction of 25 per cent in the average oil temperature, the adoption of half-elliptic rear springs in place of cantilevers on the 16 hp. and 20 hp. models, additional brake shoes in the rear drums for hand operation, centralized chassis lubrication and chrome plating. New body styles have been introduced, these consisting of Weymann type sedans and limousine. Sliding roofs are fitted to sedans and coupes in certain cases.

Always unorthodox throughout—though none the less popular for that—with a two-cylinder valveless engine with four cylinders and two combustion chambers, located under the floor, two-speed planetary gears, chain final drive and cantilever springs fore and aft, a new Trojan (10 hp.) model is even more distinctive; the same type of engine is placed behind the rear axle in a casing that resembles the integral luggage locker now so popular on British sedans. Grouped with the engine are all accessories, the radiator, fuel tank and transmission details. The latter consist of two gearboxes, one with planetary gearing and intended for normal use, and the other with alternative ratios enabling four speeds in all to be available; final drive is again by duplex roller chain through a differential that is locked

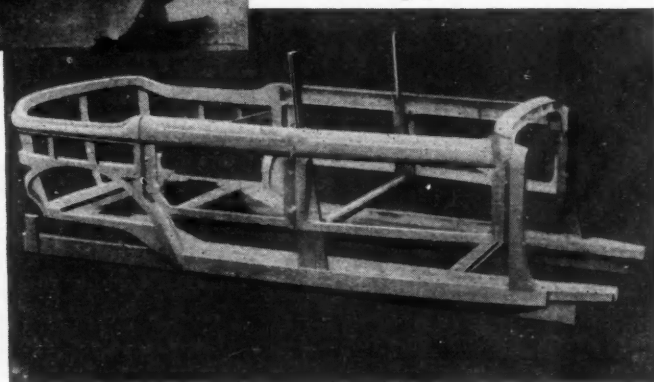
(Continued on page 614)

Trend Toward Larger Engines

Emphasized by Exhibits



Hibbard & Darrin's exhibits at the Paris Show included two unique features, the fish-tail rear fender (above) and a frame made entirely of metal, with L-section duralumin door sills



Continental automobile producers which 14 are new. American makers represented with 31

By W. F.

DETAILED descriptions of a number of cars exhibited at the twenty-third annual Paris Automobile Show, which was covered in part by a cabled report published in the Production and Equipment issue of *Automotive Industries*, Oct. 12, are contained in this article. American manufacturers were second in number to the 58 French, there being 31 represented. All other makes, including 6 English, 9 German and 7 Italian, totaled 27.

European manufacturers appear to be definitely sold on the eight-cylinder idea, for, excluding the American models, the number of eight-cylinder cars was 26. Of the total, 14 were entirely new, so that they represented nearly a 50 per cent increase in eights since last year. With one exception they had cylinders-in-line, the exception being the Lancia narrow-angle V. Minerva and Voisin were sleeve-valve models; Renault, Fiat and Lycoming had L-head and all others overhead valves.

The outstanding feature of the Talbot straight eight was the use of aluminum for the cylinders and upper half of crankcase, with nitralloy steel liners and a nitralloy nine-bearing crankshaft with the duralumin rods bearing directly on the shaft without any babbitt lining. Nitralloy liners have been used by Hispano-Suiza for both aviation and car engines for a couple of years, and although duralumin rods have been experimented with the same length of time, the Talbot appears to be the first commercial application. There are undoubted advantages in eliminating the weight of

the liner from connecting rods, but other makers claim that there is not sufficient uniformity in the metal to give them necessary guarantees for the use of this method. Duralumin rods are being used by Renault and Hotchkiss, with babbitt spun to the duralumin. Before going into production with this type of rod and shaft, Talbot carried out searching tests both on the road and the bench, with complete satisfaction. The Talbot engine has its camshaft in a tunnel in

the crankcase and operates the vertical valves through duralumin pushrods. There is a vibration damper in front. The crankshaft has a diameter of 68 mm. at the main bearings and 52 mm. at the connecting rods. Pistons are of two-piece construction, with an aluminum head and a cast iron skirt. A double oil pump is driven off the center of the camshaft, one of the pumps supplying oil to the bearings and the other circulating through an oil radiator carried under the water radiator. There is four-point attachment to the frame, with metal-to-metal at the rear and Silentbloc rubber bushings at the front. The horsepower is stated to be 100 at 3800 r.p.m.

In producing the 318 cu. in. straight-eight, Bugatti adopted the same general design as for his costly 854 cu. in. eight which is being built in very limited numbers for sale at about \$20,000. This is not a sports job but a silent, flexible car with a maximum speed of 93 m.p.h. and capable at the same time of throttling down to 4 m.p.h. on high.

Valve arrangement is the same as on other models, with three vertical valves operated by a single overhead camshaft. The feature of the engine is the cylinder casting, which is slab-sided, machined and ground all over and extended downward so low that the nine-bearing crankshaft can be mounted direct on it. On the more expensive model the water is brought right down to the main bearings, but this is not done on the 318 cu. in. job. The main bearing cap studs are screwed into the cylinder block, and each cap is slotted to a

Among European Manufacturers at the Paris Show

display 26 eight-cylinder models of ranks second in the number of entries out of the total of 116.

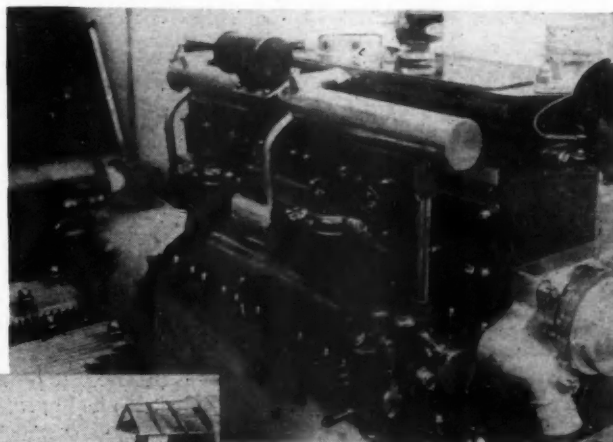
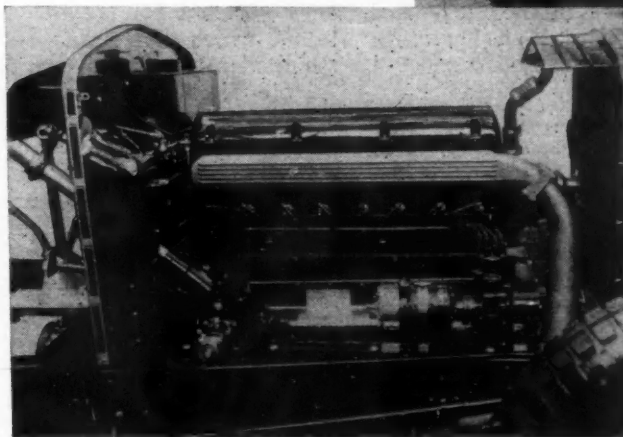
BRADLEY

precision fit on the base of the cylinder casting. With this design, the crankshaft, the camshaft drive and the two oil pumps are all on the extremely rigid cylinder casting, and the aluminum housing built around it are merely protectors carrying no working parts. Very thick bronze shells are used for the bearings, with an exceedingly thin layer of babbitt.

The engine is carried in the frame by forged hangers secured by studs to the cylinder block and having at their outer end a rather big diameter cup in which a rubber block is inserted. The base chamber is a one-piece aluminum casting attached to the cylinder block, but with a space of about 3 in. on each side, this space being filled in with an aluminum strip. On removing this strip the rods and main bearings can be seen. Dry sump lubrication is used, with the oil tank carried in the cowl and connected to the base chamber by means of flexible metal piping. The main oil filter projects from the tank and can be dismounted for cleaning without the use of tools.

Ignition is by Delco, with the distributor driven off the end of the camshaft. An unusual position for the electric generator is on the right-hand side rail, just behind the engine, with drive by one-piece belt from a pulley on the forward end of the propeller shaft. To change a belt, it would be necessary to disconnect the driveshaft, but it is claimed that belts never break. However, as a precaution a second belt is left loose around the pulley. In place of a vibration damper there is a flexible mounting of the flywheel by means of a hub on the shaft with a thick rubber ring interposed between it and the flywheel.

The transmission is combined with the rear axle and provides three speeds ahead and reverse. This is the only car in France with this construction. Axle tubes



The Voisin Big Six engine (above), showing how oil vapors are collected from crankcase, cylinder head and distributor shaft

Left—The Delage six-cylinder engine, exhibited at Paris, has overhead valves

are of chrome-nickel, heat-treated steel, and the central housing is cast aluminum. The total weight of axle is stated to be only 2 lb. more than that of other Bugatti models without transmission on the axle. The chassis weight is 2640 lb.

Delage has produced a pushrod-operated overhead-valve job with iron cylinders and iron crankcase, the two being separate to facilitate servicing; a five-bearing crankshaft, Delco ignition and Smith multi-jet carburetor. The 247 cu. in. engine develops 85 hp. and with six-passenger sedan body the performance is 5 m.p.h. minimum on high, and 75 m.p.h. over the flying kilometer, average in both directions. This car has a silent third, drive through springs with Spicer universal joints, and four-wheel brakes applied through a Dewandre servo mechanism.

The new Minerva shown was one of two sleeve-valve straight eights produced in Europe. It had a nine-bearing crankshaft lubricated under pressure from a dual pump, the second pump passing the oil through a filter and a radiator built in with the water radiator. A high tension magneto is fitted with a separate distributor, which distributes the current either from the magneto or from the batteries. The magneto is alongside the engine, slightly below the level of the crankcase hangers and hidden from view by a detachable aluminum cover plate. The radiator fan and water pump are

driven by belt. The exhaust on the left side of the engine is led 'round to the right, where it is swept down, just ahead of the forward crankcase hanger. From the head of the vertical branch of the exhaust pipe there is a lead, with a throttle set inside it, to a muff around the inlet pipe. The carburetor is a dual Zenith drawing its air through a filter under the aluminum extension from the crankcase to the side rails.

Chassis features are the Bijur lubricating system, an inclosed driveshaft and the Adex stabilizer for the rear axle. There is a patented mechanism on the brake linkage whereby the length of the brake rods cannot vary, whatever the movements of the axle.

Steyr Eight Entirely New

Steyr is producing an entirely new straight-eight designed by Dr. Porsche, who for several years was in charge of engineering at the Mercedes factory. With a piston displacement of 333 cu. in. it has cylinders in an aluminum casting having iron liners, a detachable head and an overhead camshaft. Dual ignition with two plugs mounted horizontally on opposite sides, is used; the crankshaft has nine bearings, and the carburetor is a Pallas fed from an Autopulse.

Independent rear springing has been retained. The differential housing, which combines a short torque tube, is attached to two frame cross-members. From the forward one of the two cross-members to the four-speed unit transmission, there is an open propeller shaft with fabric universal joints. Suspension is by means of a main transverse spring and an auxiliary inverted transverse spring carried above it and within the rear frame cross-member. The weight of the chassis complete is 2750 lb.

The only 12-cylinder engine in the show was built by Voisin. It is a double sleeve-valve type having a piston displacement of 235 cu. in. The two blocks of iron cylinders are mounted on an iron crankcase, which receives a three-bearing, circular web, hollow crankshaft having a diameter of practically 4 in. This appears to be the biggest diameter shaft used on any car engine. The crankcase is stiffened by transverse divisions and has the cylinders bolted to it, instead of being held on studs. The two blocks are also bolted together at their ends. A single eccentric shaft, driven by a triple roller chain at the front, is mounted in the center of the crankcase and operates the whole of the 24 sleeves.

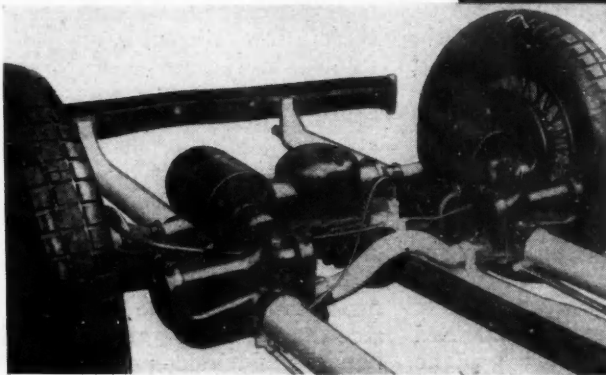
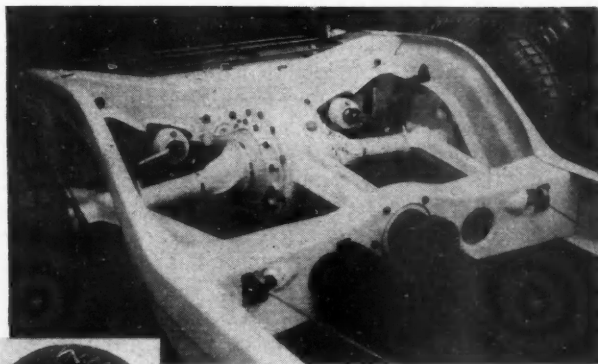
Voisin's claims for this engine are ease of servicing compared with a six or a straight-eight, accessibility of the eccentrics, impossibility of a seized sleeve causing further damage to develop, rapidity with which sleeves can be changed, and absence of vibration (although no damper is fitted) by reason of the big diameter shaft.

The space between the two banks of cylinders is inclosed by an aluminum plate, and, when this is lifted, the 24 eccentrics are exposed. Each eccentric is keyed on the shaft, and connection is made to the lug on the base of the sleeve by one arm of a bell crank. The second arm, which is almost vertical, is received in a groove on the underface of the aluminum cover, the width of which

is just sufficient for the normal movement of the connecting link. If there is rupture between the lug and the sleeve, the latter remains locked in the cylinder and the movement of the former is restricted. To disconnect any sleeve, a single nut has to be unscrewed and a pin of nitralloy steel has to be driven out. The time required to take off each sleeve is only a few seconds. Connecting rods are of the forked type. Ignition is by generator and battery, with the distributor driven off the center of the eccentric shaft. The dual Cozette carburetor is in the angle formed by the two banks of cylinders, with the exhausts on the outside. There are no important changes in sleeve construction, the material used being cast iron, the inner sleeve being thick, and the outer one thin. This engine has a 24-volt combined electric generator and starting motor driven off the nose of the crankshaft, with batteries in a locker in the tail of the car.

A feature of the water pump arrangement is an aluminum collector mounted across the front of the engine and secured by a stud and a flange to each block. In its center the water pump is mounted, the drive for this being by link belt from the crankshaft, and it has the two water inlet pipes connecting up to the radiator. This casing lifts away as a unit after taking off two nuts.

The Voisin chassis is distinctive by reason of the arrangements for weight distribution. Two gasoline tanks, which give a range of action of 300 miles, are mounted in the chassis on each side of the driveshaft. At the front they are carried on a transverse tube received in the side rails with Silentbloc bushings, this tube also being made use of to provide communication between the two tanks. At the rear they are hung by brackets to a frame cross-member. The tanks are filled through two big-mouth aluminum funnels on the left and right of the aluminum dashboard, under the hood. Behind the axle, and below a platform uniting the side rails, is a locker, the center portion of which carries a wooden tool box on rails, flanked on each side by a battery box. Starting is under 24 volts and lighting under 12 volts. The spare wheels are carried on a bracket secured to the hinged door of the rear locker.



Rear axles with independently sprung wheels were shown on the Steyr eight (above) and the Harris Leon Laisne (left). The latter used rubber in the cylinders in place of coiled springs

Voisin's claim is that his chassis is in complete balance, and this balance cannot be disturbed by the body or by the live load.

The leading change made by Renault is the removal of the radiator from the rear to the front, thus coming in line with all other Continental manufacturers. With this change he has also adopted pump circulation of water on his 193 cu. in. six-cylinder model. The pump is on the right-hand side of the cylinders, in line with the electric generator, which is now separate from the starting motor. The starting motor is in line with the water pump and engages with a ring gear mounted just ahead of the vane type flywheel. On a smaller six, of 89 cu. in. piston displacement, the radiator is also placed in front, but thermo-siphon water circulation is retained.

Citroen has changed to a transmission brake on both his four and six-cylinder models and an increase in the battery size to 90 amp.-hr. In addition, the six-cylinder model has had its frame members strengthened, the track has been increased to 56 in., changes have been made in the transmission and rear axle, and Houdaille hydraulic shock absorbers have taken the place of friction type. The mounting of the shock absorbers is transverse, the body of the absorber being attached to brackets on the frame and the arm being secured to the axle at a point very near the steering pivot. It is claimed that this mounting tends to eliminate wheel wobble.

Peugeot is out with a four-cylinder job of 68 cu. in. piston displacement, developing 24 hp. at 3500 r.p.m. and designed with a view to cheap production. With a wheelbase of 100 in. and four-passenger sedan body, the car sells at \$800, and is thus the lowest-priced car of this capacity on the French market. Mechanical features are an L-head engine mounted on four rubber blocks, crankcase with inspection covers allowing a rod and piston to be withdrawn, two-bearing crankshafts, aluminum pistons, camshaft driven by roller chain, water pump in the water outlet collector, driven from an extension of the generator shaft, from a belt and pulley on the front end of the crankshaft. The rear axle is worm type, with diagonally mounted quarter-elliptic springs having their thick ends attached to the

end of the side rails and their thin ends extending forward to the axle.

The cheapest cars on the French market, excluding small two-seaters, are the following:

Peugeot 4-cylinder 7 hp.* sedan	\$800
Citroen, 10 hp. 4-cylinder tourer	904
Renault, 6-cylinder tourer	916
Donnet, 7 hp. 4-cylinder sedan	940

* The French tax horsepower corresponds to about 10 cu. in. piston displacement.

There are no new developments in front drive. The Cord attracts a lot of attention and probably will influence European makers, for four or five leading firms have been experimenting in this direction for the last two years. The only other front drives in the show are Tracta and Bucciali, both small producers.

Independent Wheel Suspension

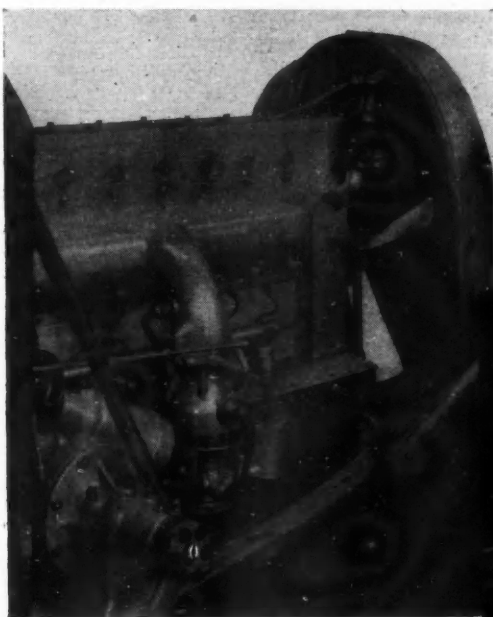
Independent front wheel suspension shows little change. Cottin & Desgouttes continue their system. The Tatra, Rohr Steyr and Lancia, all having two or four wheels sprung independently, have been in production for some time, although the three first are exhibiting in Paris for the first time. The Harris Leon Laisne with a tubular chassis and four wheels sprung independently with the use of coil springs inside the tubes, has been modified, use now being made of rubber contained in a cylinder. At the front the cylinders form a continuation of the chassis tube members. This car is now assembled with an American engine, transmission, brakes, steering gear and rear axle.

There is a more extensive use of chassis lubrication systems. The Bijur system is used by Minerva, Horch and Steyr. The Tecalemit chassis lubrication system has been adopted in whole or in part on half a dozen French chassis, but more often there is a combination of Silentbloc rubber bushings for the spring shackles with a grouping of other points, which are lubricated with a high pressure gun of the Tecalemit type.

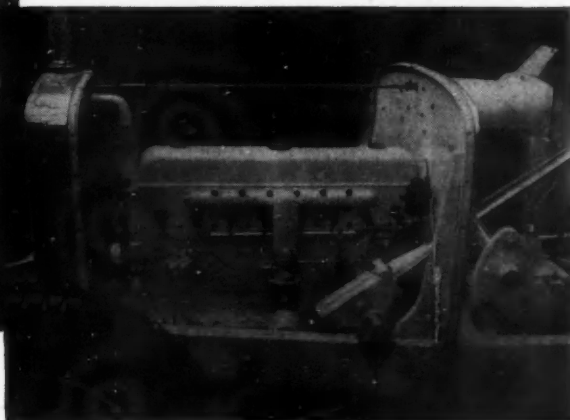
Gasoline pumps are rapidly replacing the vacuum tank used on all but the smallest cars up to a year ago. On the Lancia the electric pump is duplicated, either one or the other being put into operation by merely moving a lever, and the gasoline can be drawn from either the main or the reserve tank.

Public demand being for highly polished bodies, the fabric type has almost disappeared, and even Weymann has adopted metal construction in sections, united flexibly, with the use of patented door catch providing for movement in both a vertical and a horizontal plane.

The Marbeuf Co. has a light all-metal body built up without a frame. It is in six sections—cowl, two doors, two rear quarters and roof—each one formed of a single piece of sheet aluminum having the edges turned over to form a channel. It is by means of this channel that two adjacent sections are bolted together with strip rubber interposed. In case of damage, any



The Bugatti straight-eight (above) was shown with aluminum housings around the cylinder block



The aluminum cylinders in the Steyr straight-eight (left) attracted attention at the Paris Show

section can be dismantled without disturbing the others. Felt is glued on the inside, and the upholstery is held by screws. There is no wood except the small quantity necessary for carrying the upholstery. It is claimed that the saving in weight compared with normal construction is 220 lb.

Hibbard & Darrin have produced a built-up all-metal body known as the Sylentlyte and claimed to be 330 lb. less in weight than the wood and metal bodies they have manufactured in the past. Wood is used for the body sills only, but this is armored on its outer edge by a broad L-section band of polished aluminum, which both adds to the strength of the sills and improves the appearance of the finished car. The cowl framework is an Alpax casting. The rear quarters have a framework of Alpax and aluminum. The main door posts, to which both front and rear doors are hinged, consist of a slab of duralumin mortised into the body sills.

Airplane or fishtail fenders adopted by Hibbard & Darrin were immediately dubbed "bootlegger fenders" by American visitors, for the portion behind the wheel forms a tank. Instead of merely having an edge, the outer portion of the fender, which is flush with the hub cap, forms a flat surface; the wheel is streamlined, and a racy appearance is given to the car.

Soviet Automotive Output

(Continued from page 604)

usually involve the permission for Soviet engineers to enter the American plant and study American methods.

Just what Ford, Hercules and other American manufacturers expect to secure in return for turning over to the Soviet their designs and engineering advice seems at first a little obscure. Of course, a \$30,000,000 order, covering three years, is no small item even for the Ford interests. If, however, at the end of three years the Soviet Avtotrust is to be in a position to meet its own requirements, and has attained its position largely by Ford's cooperation, it might seem that the immediate profit from the \$30,000,000 order might be offset by the loss of all future business in that market. It is pointed out, however, that future demand developing in Russia will probably exceed the total production capacity of the projects now under way and that the Russian people, being "Ford conscious," there would be an active demand for the Ford products to supplement the output of the Nijni Novgorod factory.

Distribution of these automotive products will be handled by the Avtosyndicat, which is now in process of organization. This syndicate will be a government project and it is thought probable will handle not only the distribution but the servicing of the motor vehicles.

While the Avtosyndicat is still in process of formation, and the exact details of its operation have not yet been determined, it is considered probable that it will operate along lines similar to other distributive organizations of the Soviet; that is, where cooperatives or individuals seek to buy automotive equipment they merely will go to one of the establishments of the syndicate and purchase the car, truck or tractor, paying for their purchase in money as they would in the case of purchasing a suit of clothes or a loaf of bread. The only form of restriction which will be placed on the sale of these products will be in the way of less

favorable credit arrangements for individuals desiring to purchase automotive equipment. All this equipment which is not absorbed by the State Grain Trust will be sold, as are other forms of machinery, on five-year credits to recognized cooperatives. Individuals seeking to purchase automotive equipment will probably be discouraged, especially until the output reaches a point where it will more than take care of the demand for the Grain Trust, the cooperatives and the government tractor service stations. The discouragement, however, will probably be in the form of less liberal credit terms.

New British Models Are Sixes

(Continued from page 609)

when the pedal brake is applied. At the front is a dummy radiator and hood, the latter long enough to inclose a small six-cylinder engine, but intended for luggage, parcels, etc. In the absence of transmission details under the floor the latter has been brought very low, only 9 in. from the ground, so eliminating the need for running boards. The seating is also unorthodox, consisting of detachable units resembling deck-chairs with top and bottom rails connected by padded fabric units.

The Trojan has a wheelbase of 102 in., 56-in. track, 8½-in. ground clearance, 29 x 5-in. tires, gear ratios of 3.5, 6, 7 and 12 to 1, cantilever front and half-elliptic rear springs. The fabric sedan body has seating 50 in. wide and rear wheel braking (front brakes are said to be redundant in view of the weight distribution).

The Vauxhall Motor Co., the British concern controlled by General Motors, is specializing again on one model, the 20-60 hp. 178 cu. in. overhead valve six, but many changes have been made in the chassis, among them the following: The seven-bearing crankshaft has a larger bearing surface area and the pins are bored to reduce weight; the engine has a flexible rubber mounting consisting of two double-coned disks, one under and one above a horizontal web in the crankcase bearer arm, with a bolt passing through these units and the frame bracket; an A.C. fuel pump displaces the Autovac system; a crankcase ventilator carries fumes away under the car. The exhaust manifold is now a one-piece structure carrying the gases in one direction toward the rear of the engine. One-shot chassis lubrication is used. The horizontal rigidity of the frame has been considerably increased by a central cross-member of box-girder form; there are now five cross-members and the side rails are of deeper section; the rear springs have been lengthened; hydraulic shock absorbers are fitted; Spicer metal joints displace the fabric disk type. Lighting control is now at the center of the steering wheel; headlamps are of the twin-filament, long-range type; an extra rear light is switched on when reverse gear is engaged. Chrome plating is standard, and a new streamline front fender design is used.

Prices are much the same, the cheapest sedan being a metal panel type at £530; the fabric sedan is £565 and the phaeton £495. A new model is the Hurlingham sport roadster, a semi-racing streamlined body with a sunk seat in the tail protected like the front seats by a Vee windshield; the engine is specially tuned for high efficiency and a higher gear ratio is fitted. The price is £650.

Federal-Mogul Reduces Costs With New Facilities

Corporation increases manufacturing efficiency by the addition of a foundry, chemical and physical laboratories, mechanical handling methods, labor and space saving devices.

WHAT amounts to a complete reorganization of its manufacturing facilities is represented by the recent move of the Federal-Mogul Corp. in concentrating all of its production activities at its main plant at Shoemaker and Lillibridge Sts. in Detroit. Among the additions made to this plant are a \$300,000 foundry, a machine shop addition of 26,400 sq. ft., new chemical and physical laboratories, etc. Material-handling devices in the remainder of the plant, as well as other labor and space-saving innovations, have further contributed toward manufacturing efficiency.

Reduction in manufacturing cost is a natural result of this move. Total plant facilities now cover an area of over 100,000 sq. ft. While it is stated that a considerably higher volume can also be handled than for-

By **ATHEL F. DENHAM**

merly, facilities for future expansion are provided.

Perhaps of greatest interest is the new bronze and babbitt foundry, which has an area of 39,600 sq. ft. In the bronze foundry everything is centered about an elliptical periodic motion table type conveyor. This conveyor carries the finished molds from the molding machines at one side to the pouring floor and shake-out at the other side, the empty flasks returning on the conveyor to the molding machines.

Machine molding and bench molding are both used. The machine molders have overhead sand hoppers and air-operated jolt ram molding machines. Air-operated vibrators are also attached to the white metal patterns to loosen them from the molds. Passed the pouring floor and beyond the conveyor are located the bronze

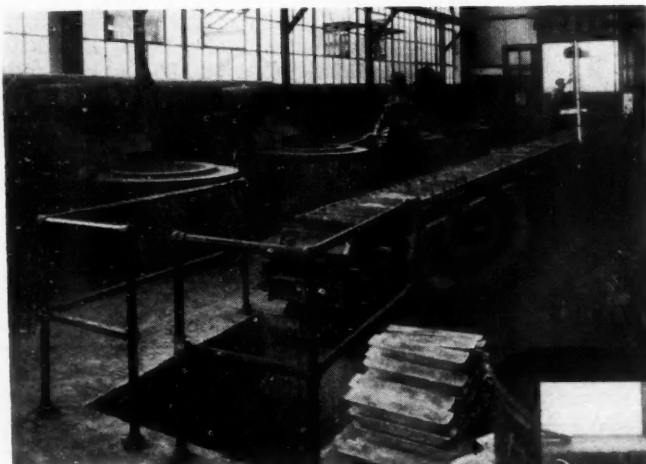
melting units, consisting of three coke-fired cupolas for large runs of one type of metal, 16 pit crucibles for shorter runs and two oil-fired reverberatories. Between these and the casting conveyor is a network of overhead monorails to facilitate handling of the pouring ladles. Being adjacent, however, pouring ladles have to be transported only a short distance, resulting in low



General view of the arrangement of Federal-Mogul bronze foundry, showing the periodic motion table type conveyor about which are grouped the various operations

In the foreground of the illustration to the right are shown the pit crucibles used for short runs of metal. Three coke-fired cupolas are available for the heavy runs





Section of the babbitt foundry showing the pig conveyor with automatic water quench and dump

Babbitting of Federal-Mogul main bearings is performed on a six-station belt-driven centrifugal babbitter. It will be noted from the illustration at the right, that the belt is used to index as well as drive the spindles. At the extreme right is the tinning bath

losses in the temperature of the metal.

Beyond the pouring floor is the shake-out floor. Here the flasks are dumped onto a grating which retains the casting, while permitting the molding sand to drop through onto a belt conveyor, which returns it to the automatic hoppers at the molding machines after going through an automatic sand-conditioning apparatus. An hourly test is taken of the sand to check its uniformity.

Next to the shake-out grate are located the shear presses for removing the castings from the grates. Here also are found sand-blast installations and tumbling mills. Space is provided in every case for the installation of additional equipment without affecting the centralization of work around the main conveyor.

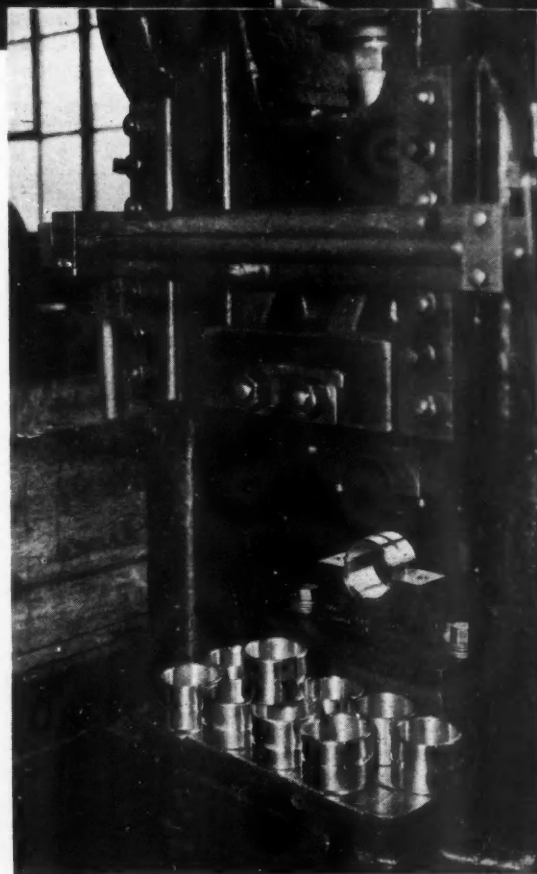
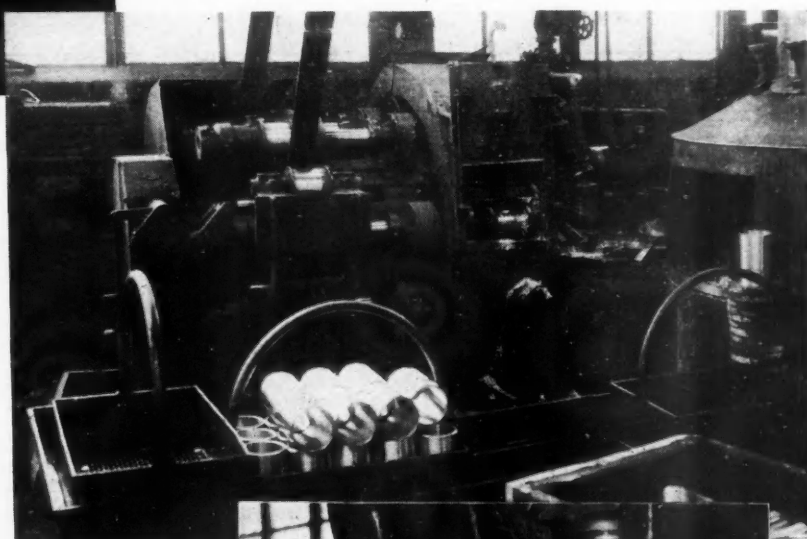
The babbitt manufacturing department is located in another section of the new foundry, and is similarly built around a mold conveyor. At one end are the mixing kettles, pit fires and a reverberatory smelting furnace, etc., for the reclamation of drosses, etc. The full molds travel down the conveyor, to which they are attached, pass under an automatic water quench and dump out at the end, the empty molds returning below to the pouring points near the mixing kettles.

Although most of the metal used by Federal-Mogul is virgin, this company does use its own machine shop turnings. For this purpose a rigid control system has been established to prevent mixing of turnings from different runs of metal, separate bins for the turnings from each of the major runs being provided. To insure against contamination, all turnings before being used are freed from iron by a double magnetic separation.

From the foundry, bushings and bearings pass directly into the adjacent machine shop. Here productive labor is reduced to the minimum by combining operations and machine tool and fixture design. Bushings are first rough and finish broached inside on a Toledo press with a long broach. The latter has a burnisher at its upper end to completely finish the

inside of bushings in one operation. Moreover, the bushings themselves are cast in lengths of two to four and are broached before cutting apart. This also eliminates considerable duplication of equipment.

Next, bushings are rough and semi-finish turned on fairly standard lathes. At the same time they are cut into lengths, the cutting-off tools also chamfering the bushings. Oil grooves are next cut inside, using lathes equipped with reciprocating cam-operated tool block slides. On bushings in which full-length oil grooves are not desired, the tool slides are also given a cross-wise movement by another eccentric. By proper selec-



Precision, or interchangeable main bearings, are formed to final size before splitting in the Toledo toggle press shown above. These dies produce two semi-cylindrical halves connected by a short, straight section which is later removed in the sawing operation

tion of eccentrics and relative spindle speed of the lathe, practically any shape oil groove can thus be cut.

Finishing the outside diameter of bushings to .0005 in. is also performed in one operation through the use of centerless grinding equipment with automatic feed. Automatically locating and clamping fixtures operated from the drill press hand-feed lever are used for high-production drilling of oil holes in bushings.

Babbitted bronze-backed bearings, such as automobile main bearings of the full-half shimless type, are cast, rough machined, babbitted and semi-finish machined slightly oversize on all diameters, so as to allow for stock removed by the splitting or sawing cut, and still permit of the forming of two complete half-circle shells. The majority of the so-called full-half or shimless bearings are of the interchangeable precision type and do not require line-reaming after they are assembled in the motor, the height from the bottom of the bearing to the parting line, and also the wall thickness, being held to a tolerance of .00025 in.

Following the centrifugal babbitting of the rough-machined bronze castings, the interchangeable type bearing has its inside diameter semi-finished to fairly close limits. It is then faced and semi-finished on the outside diameter, after which the full bearing is formed on special presses to elliptical shape, or rather to a shape with two semi-circular sections connected by a short straight portion. This connecting section is removed by the sawing operation, thereby leaving the two half sections as previously mentioned. The bearings are split on special hand millers equipped with two arbors and two saws for cutting both sides at the same time.

For the drilling of the oil holes, etc., in bearing halves, two general types of jigs are used. On those operations permitting the use of fixed jigs, cam-operated self-locating locking mechanisms are found. For such operations as involve drilling of holes at various angles, thus requiring movable jigs, the shell is locked in the jig by means of a wedge.

Following the forming, sawing, drilling on the precision type bearing, the split bearing halves are mounted on arbors, locating from the inside surface, for finish grinding. Grinders with hydraulic feed are used for the latter operation, with the arbors designed to hold several of the plain bearing halves next to each other lengthwise and locked on the arbor by means of

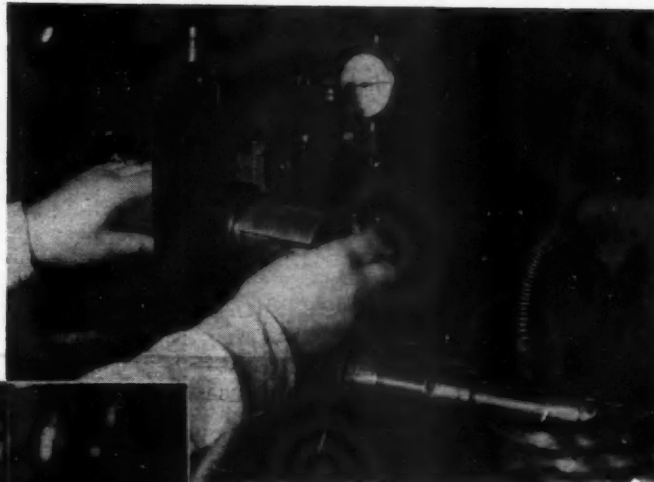
a single endwise clamp. The operator loads one arbor while the other is in the grinder.

Flanged bearings of the precision type have the outside diameter between the flanges ground on another type of special grinder, with special automatically locating fixtures to promote rapid loading.

Following the finish grinding, all precision bearings are transferred to the finish broach department, which is located in a separate part of the plant to avoid all possibility of grit from the grinders getting into the precision broaching machines. The latter are specially designed horizontal machine tools, and are of two classes, the first having herringbone type flat broach blades for finishing the contact faces to height, and the second class using a series of cylindrical type broach cutters for broaching the inside surface to a mirror-like surface.

On the first class, locating is either from the dowel holes in the bearing shell (when these are also used for locating in the crankcase assembly, rather than just to prevent the bearings from turning) or from the split faces themselves by means of a leveler. Clamping the shell half into a ground concave block, which represents the bearing seat in the crankcase, in either case, is by means of a suitable semi-cylindrical plug in the bore of the bearing.

Locating and clamping for broaching to wall thickness is from the finished contact faces. In both types of broaching machines automatic ejection is a characteristic of the fixture design, this ejection occurring in most cases at the end of the machining and before the return stroke. All the operator has to do, therefore, is to load the bearing halves into the machine tool and start the machine.



An inspection fixture (above) is mounted on each of the final broaches to wall thickness, for measurement of the latter over the entire circumference of the bearing. Tolerances of .00025 in. are adhered to. At the right of the fixture is the broach which is used to finish to wall thickness



Grinding the OD of main bearing halves precedes the final sizing to wall thickness and split face height (left). Note that the arbor being loaded contains four bearing halves. One arbor is loaded while bearings on the other are ground

Just Among Ourselves

"Hear! Hear!"—
"Hey! Hey!"

AT a banquet in London recently, according to *Judge*, the Honorable F. O. Roberts, minister of pensions, was called upon "after an orgy of orations of politics and industry. Instead of making a speech, he reached under the table, hauled out a fiddle and played Loch Lomond." Our humorous contemporary suggests that by expanding this idea "thus we might achieve a sort of moral equivalent of oratory." Sounds to us like a good idea. We remember a few years back that several important executives danced jigs at a banquet of the Motor & Accessory Manufacturers Association, thus earning more really enthusiastic applause than those few who attempted to speak. Aside from that occasion, however, we don't remember of anything like this having been tried in automotive circles. If the practice spreads, we may find Henry Ford dancing barn dances at a dealer meeting.

* * *

Factory-Dealer Meetings Might Use Musical Dialogue

CERTAINLY the idea might be applied to the various luncheons and dinners given by factories for dealers during automobile show time this year. Instead of giving a fiery forty-minute pep talk to dealers telling them how much the factory needs their help, some talented sales manager might well get up and whistle one verse of "That's How I Need You." Then, a dealer representative might respond with a mouth organ solo, "Are You Sincere?"

Another sales manager who had planned to excoriate dealers for their lack of efficiency and effectiveness might, if gifted vocally, merely substitute for his

talk a couple of specially worded verses of "Don't Be Like That!" Of course, he would be taking the chance that some dealer with a piccolo handy would step up on a table and toot "You Made Me What I Am Today." That would be *his* problem.

But, as Ring Lardner would say: "That's enough to give you the idea; you can work out lots of variation for yourself."

* * *

American "Invasion" of Europe Brings Reprisals at Paris

WE are in receipt of a special communication from W. F. Bradley, our European correspondent, which says that the French campaign against the so-called American "invasion" was more pronounced at this year's Paris Salon than at any previous exhibition.

Although there were 31 American makes exhibited, Bradley points out, as compared with 27 of all other nations combined, not a single firm from the United States secured a main floor position. German, Austrian and Czecho-Slovakian companies which never exhibited before had main floor stands, but all American firms were under the balconies. "This was not discrimination by the show management," Bradley says, "but a strict application of the rules which make it impossible for any American firm to have a booth on the main floor."

* * *

French Actively Oppose the American "Menace"

FURTHER indications of the French industry's opposition to American products are brought out in the following ex-

cerpts from this interesting communication of Mr. Bradley's. He writes in part:

"Newspaper articles stress the fact that there are only two automobile manufacturing groups: European and American. The idea is prevalent that General Motors control Citroen and Peugeot in France, Fiat in Italy, as well as owning Opel in Germany. These firms deny that General Motors have any voice in their management, but it is stated on good authority that the American banks partly responsible for financing Citroen last month obliged this maker to dismiss one thousand 'dead heads' in order to reduce overhead.

"When President Doumergue visited the Grand Palais, Gabriel Voisin succeeded in holding him sufficiently long to explain that in 1870 the country was in grave danger, and that a danger of equal gravity menaced them now. He then slipped a booklet into the hands of the President in which the 'American menace' was set forth. In the south of France a very active and successful campaign is being carried out against American cars, the argument being that as the United States has shut out French wines it is illogical to admit American automobiles to France.

"Concurrently," Mr. Bradley continues, "there is a strong campaign against the high taxes levied on automobiles in France. The Automobile Club de l'Ouest, in a letter sent out to all Deputies in its district, points out that in nine years the purchaser of a cheap car hands over to the Government, in direct taxation, an amount more than the original cost of the car.

"One maker points out that an indirect advantage of American activity in Europe is that the public has been converted to big piston displacements."—N. G. S.

Ross Cam-and-Lever Steering Gear Has Roller-Bearing Stud

New model has rolling contact within the walls of the cam groove replacing the sliding motion of the former unit, which had the pin forged integral with the lever.

A NEW model of the Ross cam-and-lever steering gear, in which the lever stud, which heretofore has been forged integral with the lever, is mounted in roller bearings therein, has been announced by the Ross Gear & Tool Co., Lafayette, Ind. This gives the stud a rolling contact with the walls of the cam groove, while formerly the contact was a sliding one. Aside from the reduction in friction resulting from this change in design, the wear between stud and cam has been greatly reduced, consequently less service attention is required by the gear.

Rolling motion of the stud is permitted by means of two special Timken roller bearings of chrome-molybdenum steel. In production the roller bearing assembly is set up tightly and is then spun by means of an electric motor. This process is followed by an inspection to see that the bearing rolls with sufficient ease, and that there is no lost motion. Fig. 3 is a phantom view of the complete steering gear.

A screw in the side plate bears on the end of the cross-shaft so that the whole cross-shaft with the roller bearing assembly can be adjusted endwise. This makes possible prop-

er adjustment between the tapered stud and the cam. If the roller bearing assembly does require adjustment in service, it can be easily reached by simply removing the side plate. Adjustment of the bearing itself follows standard practice.

Use of the side screw adjustment for moving the cross-shaft endwise does not adversely affect the alignment of any part. As shown in Fig. 1 at A, the cam is mounted on ball bearings of a type that takes both

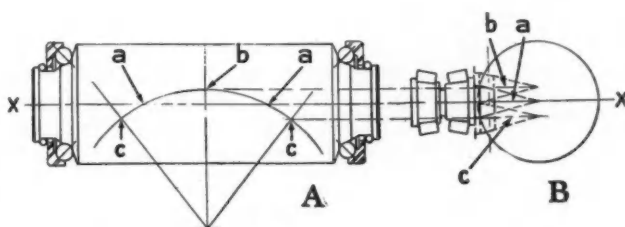


Fig. 1—Diagrammatic representations of Ross cam and lever mechanism

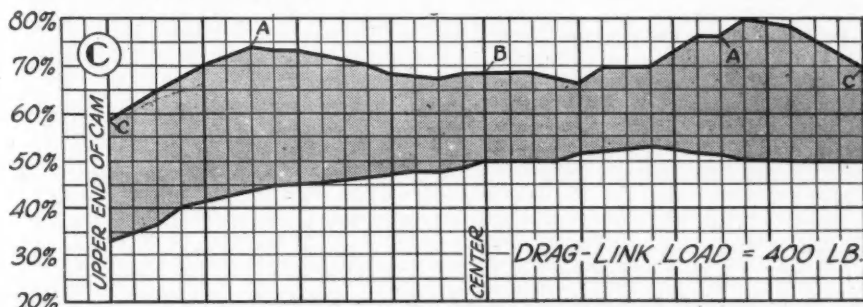
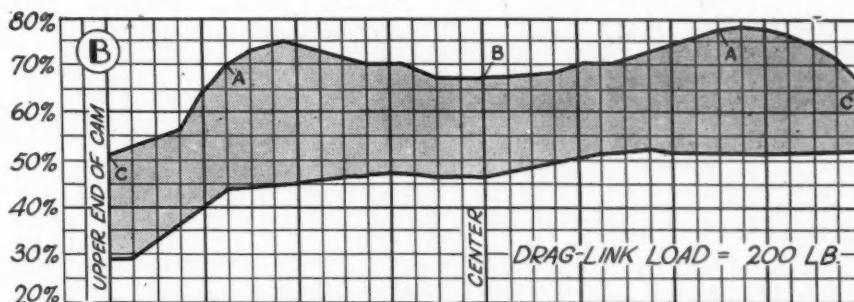
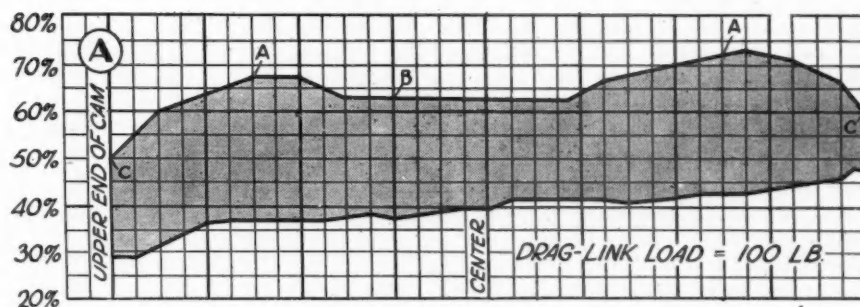


Fig. 2—Efficiency curves of Ross heavy-passenger car size, roller-mounted type steering gear for three degrees of loading, as compared with fixed stud type (upper and lower curves respectively). The height of the shaded area shows the increase of efficiency



Fig. 3—Phantom view of new Ross cam - and - lever type steering gear, showing the stud mounted on roller bearings

radial and thrust loads. The diagram B of Fig. 1 shows the various positions assumed by the tapered stud throughout its entire range of steering movement. If the tapered sides of the stud were projected, when

it is at either point *a*, they would intersect at the center of the cam, and in these particular positions there is true rolling contact between the tapered stud and the cam. In position *b*, the center driving position, and positions *c*, the extreme right and left positions, the apex of the stud cone is only slightly displaced from the center line XX.

Fig. 2-A shows the overall efficiency of the new rolling-stud type in the heavy passenger car size (upper curve), as compared with the efficiency of the older fixed-stud type in the same size (lower curve). These two efficiency curves were taken with a load of 100 lb. on the drag link. Fig. 2-B shows efficiency curves for these same two gears for a load of 200 lb. on the drag link, and Fig. 2-C for a load of 400 lb. These curves show very plainly the increase in efficiency produced by the use of a roller-mounted stud as compared with a fixed one.

At points *a* in the charts, which correspond to point *a* in Fig. 1, at which the rolling contact is theoretically perfect, the efficiency is slightly greater than at point *b*. The reason there is no similar increase in efficiency from point *b* to points *a* in the curves of the fixed-stud type is that there the stud slides throughout its whole range of travel.

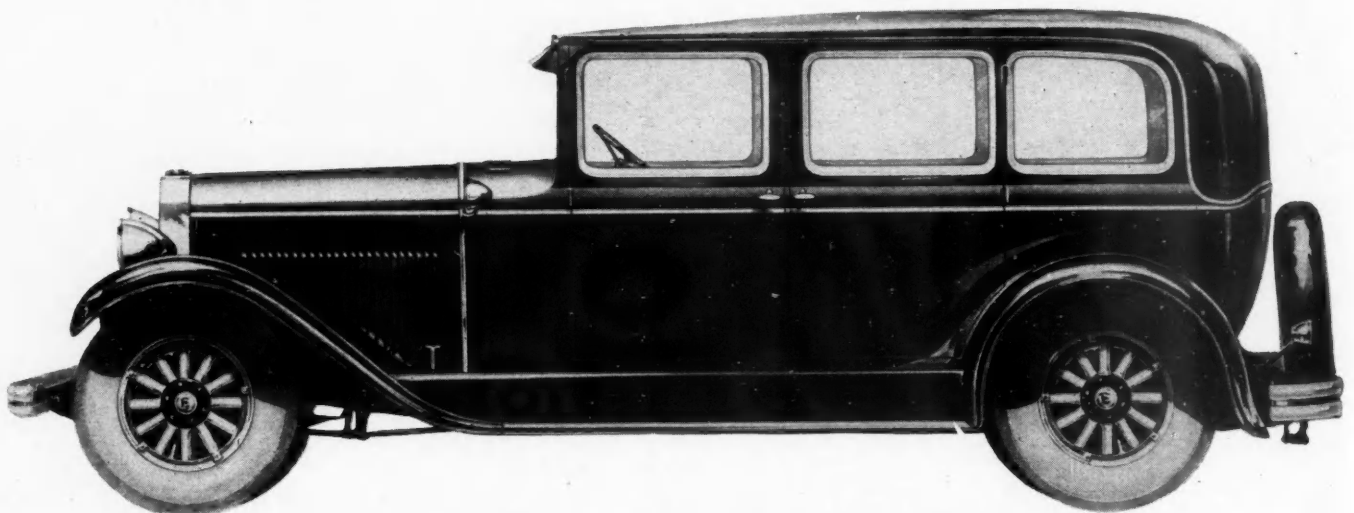
It is stated by the manufacturer that this new steering gear when in use has a solid, safe feeling which gives drivers assurance that they have full control of the vehicle at all speeds, and under any condition of traffic.

Elcar Produces Four New Models

THE 1930 Elcar line of the Elcar Motor Co., Elkhart, Ind., now in production, consists of four models, three eights-in-line and one six. Two of the 8-cylinder models, the 130 and the 96, are regularly fitted with four-speed transmissions, while such transmissions will be furnished on the option of the purchaser at slight extra cost with the third eight, the 95. Adjustable front seats on all sedan models is another innovation for Elcar. The two smaller eights and the six are new editions of models marketed last year, while the larger eight, the 130, is new. In all there are thirty-two cars in the four Elcar lines ranging in price from \$995 to \$1,995.

The new eight-cylinder model, the 130, is similar in most respects to the 96, but it has a longer wheel-base (130 as compared with 123 in.), and a more powerful engine. The engine has a bore of $3\frac{1}{4}$ and a stroke of $4\frac{1}{2}$ in. and develops 140 hp. at 3300 r.p.m. The clutch is a double-plate, dry type with no means for adjustment. A U.S.L. battery of 117 amp.hr. rating forms part of the electrical equipment. Firestone balanced tires, 30 by 7.00, are standard equipment. Spring action is controlled by four two-way hydraulic shock absorbers.

The fuel tank has a capacity of 19 gal. and fuel is fed to the carburetor by mechanical pump.



The new Elcar Model 95 five-passenger sedan is priced at \$1,495

Brill's New Rail Car Engines

Among the Largest Produced

Announcement is made of two powerplants, one a six-cylinder and the other an eight-in-line, of similar design, developing 400 and 535 hp. respectively.

THE J. G. Brill Co. of Philadelphia has developed and is now offering for sale two completely new powerplants of 400 and 535 hp. respectively. They are larger than any models previously made by this company for rail car use, and are among the largest ever produced.

The engines are generally similar and have cylinders of the same size, but one is a six-cylinder unit and the other an eight-cylinder-in-line. Likewise, the electrical transmission equipment, which was specially designed to match these engines in cooperation with engineers of the General Electric Co. and the Westinghouse Electric & Manufacturing Co., is identical as to type, control arrangements, etc., for both engines, differing only in size.

The eight-cylinder equipment is illustrated and described in detail in this article, and it will be understood that the six-cylinder unit differs only in delivering less horsepower and being equipped with a trans-

mission, radiators, fuel tanks, etc., of correspondingly smaller capacities.

In addition to the main engine, a small automotive type four-cylinder engine of 15 hp. is used to drive a 32-40-volt generator, having a continuous rating of 7.5 kw., for battery charging, excitation, lights, air compressor operation, etc., so that when considering the car as a whole the actual horsepowers installed are respectively 415 and 550.

The main engines have been completely designed by the Brill organization and embody all the features characteristic of previous Brill engines together with numerous improvements suggested by recent experience in the field. They are of 8¾-in. bore and 10½-in. stroke and are designed for a normal speed of 950 r.p.m.; the piston displacement of the six is 3788 cu. in., while the eight has 5051 cu. in. These engines weigh respectively 8000 and 10,000 lb. The rated horsepower represents a brake mean effective pressure of about

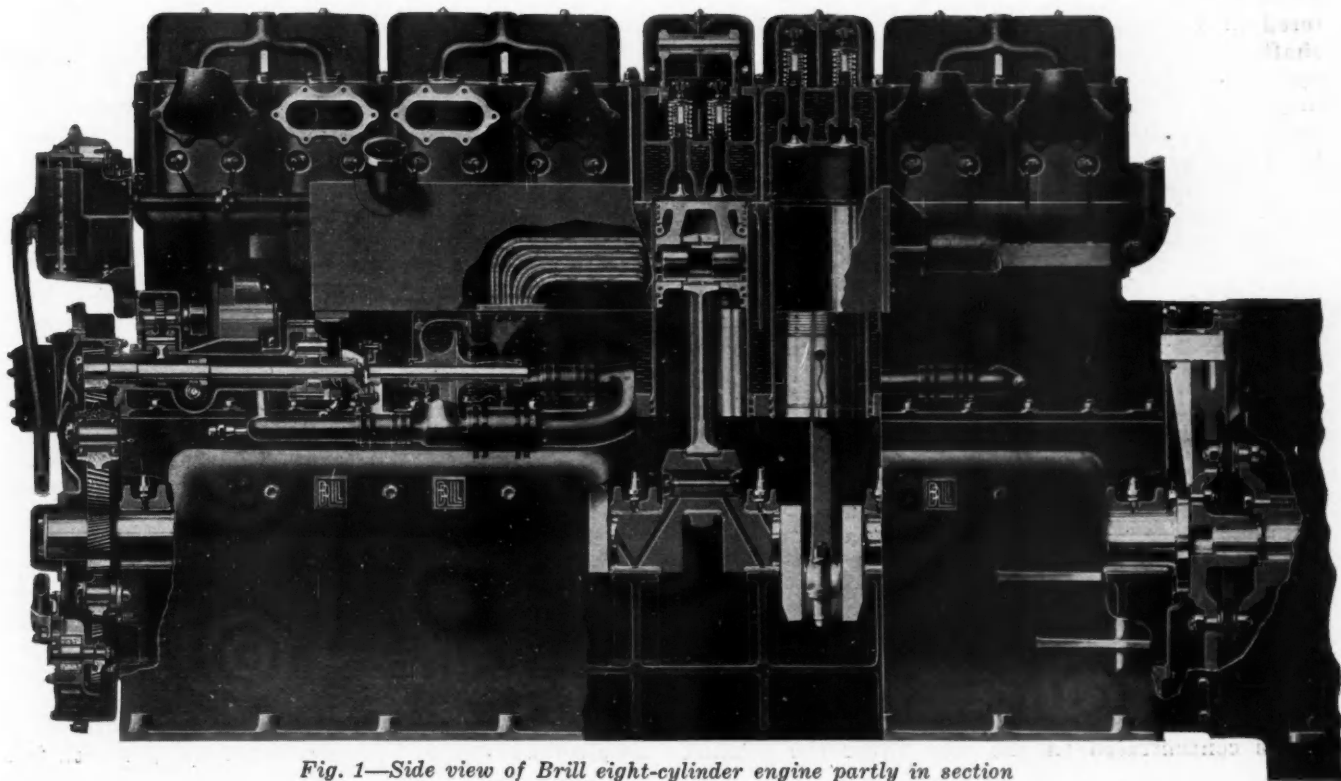


Fig. 1—Side view of Brill eight-cylinder engine partly in section

87 lb. p. sq. in., which is well below the maximum that can be obtained. It is expected that new engines on test will develop at least 10 per cent above the rated power, and that the engines can be operated at full rated horsepower whenever desired throughout their life.

The base is an aluminum alloy casting in one piece, and combines what would ordinarily be known as the crankcase, oil pan and bedplate, extending from the flange on which the engine is mounted to the bottom of the cylinder block. The crankshaft is supported in this base and can be removed through the top by removing the cylinder block and end covers. This base also carries an integral semi-bell housing at the rear end, to which the electric generator is attached. The generator is driven by the engine through a flexible steel disk coupling. The forward end of the armature shaft is piloted in the flywheel, the generator being of the single-bearing type. The cylinder block, which is also in one piece, bolts to the top of the base and when in place gives a combined depth of 52 in., these two parts together forming an extremely rigid and substantial support for the crankshaft, due to the unusual stiffness and depth of the section. By reference to Fig. 1 it will be noted that the base includes ribs adjacent to the main bearings on both sides, which transfer the stress directly from the main bearings to the cylinder block, avoiding any possible bending strains in the crankcase and base castings, such as are commonly encountered in a base-mounted crankshaft. Convenient hand hole openings are provided on both sides of the base for inspection or adjustment of bearings, and all exterior apparatus is so arranged as to avoid interference with these openings.

The cylinder liners are of the removable type, and are of nickel-chrome cast iron, heat-treated, machined all over and ground to size. Two rubber seal rings are used around the bottom of the sleeve to prevent water leaks.

The cylinder heads, which are cast as individual units, one per cylinder, include a novel combustion chamber and valve arrangement, for which patent application is pending. As in previous Brill engines, two intake and two exhaust valves are used, these having an outside diameter of $2\frac{3}{4}$ in. and a throat diameter of $2\frac{1}{2}$ in., with $9/16$ -in. stems operating in removable guides. The exhaust valve guides are of aluminum bronze. Four relatively small valves are used per cylinder in preference to two large valves, because of the better cooling of valves, with consequent longer life of valves and valve seats, less valve noise, and decreased detonation. Past experience has demonstrated that in engines of large size, seat and valve life are more than doubled in this way.

The head is so designed that the combustion chamber is concentrated on one side under the exhaust

valves, while the other side of the head, which includes intake valves, has a very limited clearance over the top of the piston. In this way the advantages of the high-turbulence type of head, as now commonly used on automobiles, are obtained, without at the same time losing the advantages inherent in four-valve overhead valve design. It is expected that this head will materially reduce the tendency to detonation, reduce the fuel consumption, eliminate slow burning or after-burning of fuel, and decrease the amount of spark advance

necessary. It also makes possible satisfactory ignition with two plugs, whereas three or four have heretofore been found necessary, even in engines of somewhat smaller size. The cylinder heads are cast of high nickel-chrome iron, roughly machined, annealed and finally finish machined. Two entirely separate exhaust ports are provided, one per exhaust valve. Water passages are so arranged that water is forced around the spark plugs, exhaust valves and exhaust ports. The bronze guides, to which reference has already been made, are expected to aid materially in cooling the exhaust valves. The cylinder heads are completely interchangeable.

The pistons are of the Butler constant-clearance nickel-aluminum type. They are fitted with five $5/16$ -in. cast iron rings—three compression and one drain-oil ring above the piston pin and one oil-distributing ring at the bottom of the skirt. The piston pin is of a floating design and is secured by suitable keepers fitting into the piston.

The crankshaft is a high-carbon hammered forging, fully heat-treated, machined all over and balanced. All main bearings are of $5\frac{1}{4}$ -in. diameter, all crank pin bearings of 5-in. diameter; cheeks are $2\frac{1}{8}$ by $6\frac{1}{2}$ in. The front and center bearings are 5 in. long, the rear bearings of 5-in. diameter; cheeks are $2\frac{1}{8}$ by $6\frac{1}{2}$ in. The connecting rod bearings are $3\frac{5}{8}$ in. long.

Both main and connecting rod bearings are arranged with the babbitt in the cap half spun directly into the high-carbon forged steep caps, while the opposite half of the bearing is a babbitt-lined bronze-backed shell, having a total thickness of $\frac{1}{2}$ in. Since the babbitt lining of the cap half is comparatively thin, the ends of the bronze-backed shell abut the cap at the joint and are thus securely anchored without resort to dowels, screws or rivets. Thus the entire bearing surface can be kept fully round and free from grooves or reliefs of any kind, except that the main bearings are provided with circular grooves providing passage from the oil leads through the drilled crankshaft to the connecting rods. This bearing construction makes it possible to remove any bearing without disturbing the crankshaft. It is expected that the elimination of the dowels will result in a marked improvement in bearing life.

The connecting rods are of high-carbon heat-treated drop-forged steel, of I-beam section, fitted with two

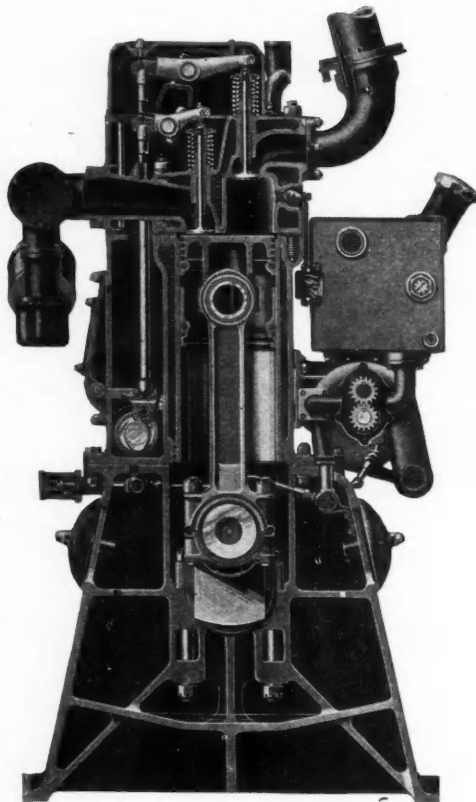


Fig. 2—Transverse section through Brill 535 hp. engine

nickel-steel bolts for securing the cap. They are bushed at the upper end for a 3½-in. piston pin of the conventional tubular, case-hardened and ground design.

The valve arrangement makes it possible to operate both intake and exhaust valves from a single camshaft, which is located at the base of the cylinder block. Each cam, through a rocker-type follower, operates a tubular push rod, which is fitted to a suitable rocker arm located on the cylinder head. The camshaft is supported in nine main bearings, 3¼ in. in diameter, and each 2½ in. long, except the front bearing, which is 4½ in. long. A small spring is provided between the rocker-type cam follower and a collar on the push rod, so that all clearance is concentrated at this point, which reduces valve noise. The camshaft is mounted in a tunnel or trough, so arranged that the cams continually dip in oil. The cam and cam rollers are of low-carbon double-quenched carbonized alloy steel. The cam rollers are of 2-in. diameter by 1-in. face.

Ignition is provided by two independent, interchangeable, high-tension Scintilla magnetos, each fitted with an impulse coupling. Four 2½-in. carburetors are used, opening into the intake manifold located on the right side of the engine, while the exhaust is handled through eight independent vertical exhaust pipes discharging into a muffler built on to the roof, all as generally shown in Fig. 3. It is believed that the use of a separate exhaust stack for each cylinder is a distinct advantage. Rail car engines, particularly in these larger sizes, operate at a high power factor and where two or more cylinders are served by the same exhaust manifold, it is very difficult to avoid trouble with manifold castings, gaskets and joints.

The oiling system, while generally similar to that used in previous Brill designs, represents a development. Oil is carried in a 30-gal. tank mounted on the exhaust side of the engine above the water and oil pressure pumps, as shown in Fig. 2. The level of oil in

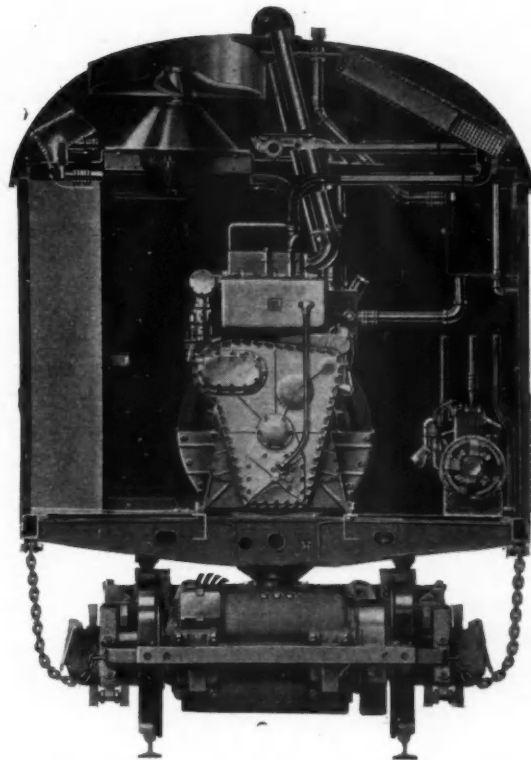


Fig. 3—Transverse section of Brill rail car showing powerplant installation

this tank is indicated by a float-type gage. Oil is drawn from this tank through the gear-type pressure pump, whence it is delivered to an oil manifold running the length of the engine inside the base on the exhaust side. From this point oil is fed to every alternate main bearing. The crankshaft is completely drilled for oil passage from end to end. Connections are taken from the remaining main bearings to a low-pressure manifold running the length of the engine beneath the camshaft. This manifold is secured by hollow cap screws, through which the oil is fed by suitable passages to the camshaft bearings, thence through copper tubing and connections to the rocker arm mechanism on the cylinder heads. The push rod ends of the rocker arms are drilled, carrying oil to the top of the push rod, whence it runs down to the valve rocker and into the trough surrounding the camshaft, the overflow draining back to the sump. Cylinder walls and piston pins are lubricated by spray from the main and connecting rod bearings. The crankpins are drilled and constitute each an oil reservoir of 2-in. diameter. This reservoir is useful in starting a cold engine, in that oil is immediately available at the bearings without waiting for pump pressure to build up. Oil then drains to the sump, whence it flows to the bottom of the gearcase at the front of the engine and is picked up by a scavenge pump, which delivers it to the Hall-Winslow type filter built into the engine, from which latter it returns to the storage tank. An oil pressure regulating valve is fitted. Water from the radiators is drawn through a heat interchanger in the oil tank to the water pump, in this way maintaining the correct oil temperature.

The timing train consists of four main gears. These are of the helical type, having 2¼-in. face and a normal diametral pitch of 7. In addition to the above gears, two lighter gears are arranged to drive the scavenge pump, and another set of small gears

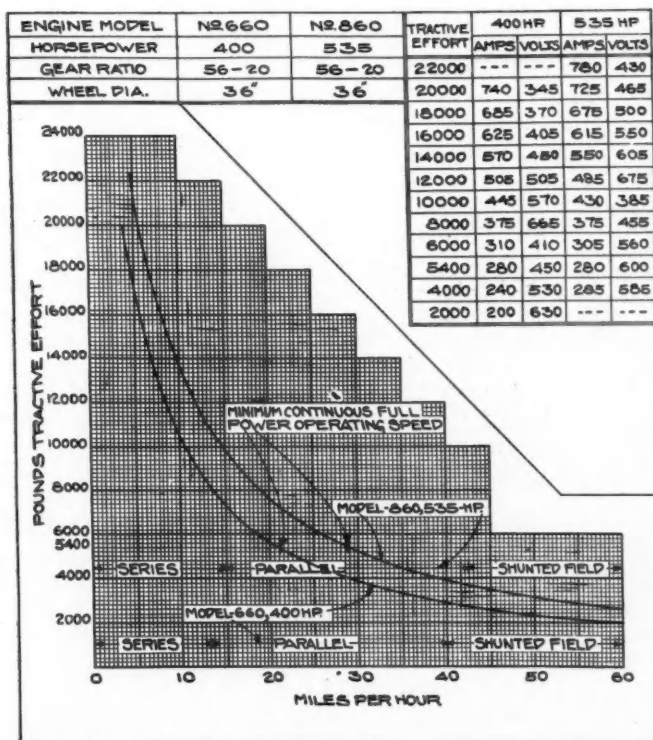


Fig. 4—Speed-tractive force curves for Brill six and eight-cylinder engines

drives the magnetos from the accessory shaft.

The cooling system is generally similar to that used in recent Brill designs, and is so arranged that whenever the engine is shut down, the water is drained inside the car, leaving the radiators dry, thus preventing freezing. With the engine not running, surplus

and load consistent with smooth operation of the engine and maximum fuel economy. This feature is also the subject of a patent application.

The electrical equipment consists of two groups. The high-voltage group consists of a shunt-wound generator driven by the main engine, with the field regulated

by the governor, as above mentioned; suitable traction motors and control apparatus, consisting of a small master controller which governs motor connections, i. e., forward or reverse, and series, parallel or shunt field arrangement of traction motors, together with the necessary switches and contactors. The fan motors and a 25-ft. capacity high-voltage air compressor are included in this group. There is no exciter attached to the main generator. The low-voltage group consists of a small

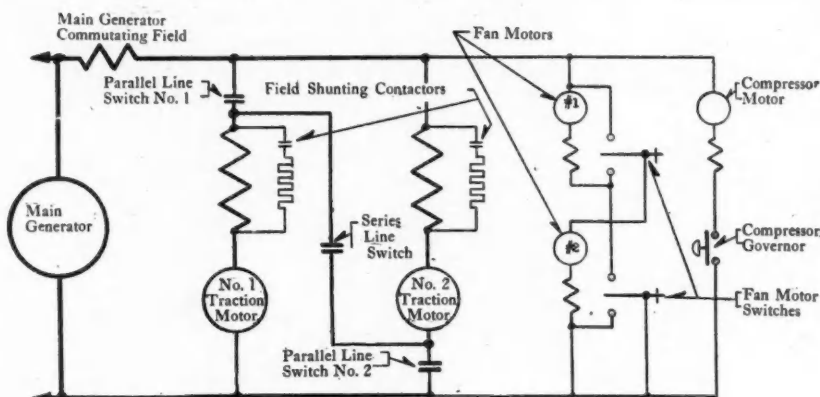
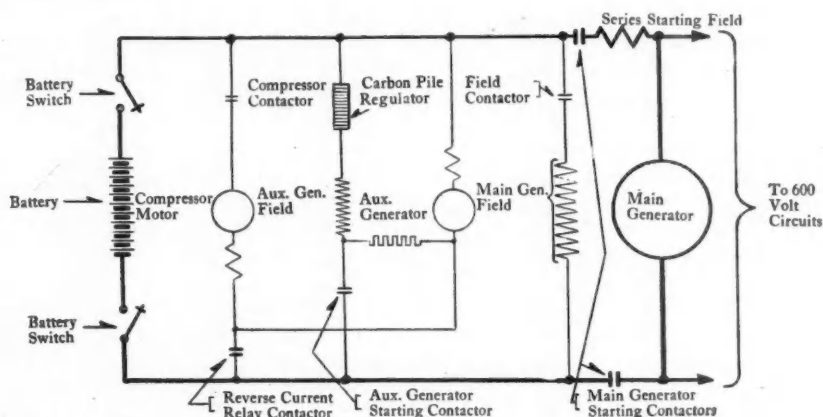


Fig. 5 (Above)—High voltage circuit diagram

Fig. 6 (Right)—Low voltage circuit diagram for Brill rail car engine



water accumulates in the expansion tank (Fig. 3). When the engine is running, this water is drawn by the pump through the oil cooler and delivered to the engine, thence to the cross-flow radiators located in the roof, from which it returns to the suction side of the pump. The water pump has a capacity, at the rated speed of the engine, of 240 gal. per min. Air is drawn through the radiators by two electrically driven 40-in. constant-lead cast-aluminum fans. These fan motors may be operated either in series or in parallel, depending upon the cooling requirements. The cooling system is so designed as to give satisfactory cooling regardless of speed or direction of car movement, or prevailing direction of the wind. The partial vacuum created between the radiators and the fan causes air to be drawn from the engine room through the shrouds surrounding the exhaust pipes, thus providing for engine room ventilation and also cooling the exhaust pipes. The air from the fans is discharged vertically immediately back of the muffler, so that the exhaust gases are carried into the air, thus preventing their reaching the interior of the car body.

Fuel is carried in suitable tanks beneath the car, from which it is fed by vacuum tanks operated by a vacuum pump on the main engine. These vacuum tanks are in duplicate, to prevent tie-up of the equipment in case of failure of either tank.

A variable speed governor is provided. The hand throttle at the operator's position controls the maximum opening of the carburetor throttle, in addition to controlling the operating speed of the engine through the governor. This governor, in turn, through an oil relay, operates a rheostat or controller in the field of the generator in such a way that if the engine speed rises, the load is increased, and vice versa. Thus it is possible, for any desired engine operating speed, to get the best combination of throttle opening

four-cylinder automotive type industrial engine, which drives a 32-40-volt generator mounted as a unit with it, the battery (32-volt), a 25 cu. ft. capacity, 32-volt air compressor, and the necessary apparatus for control. The field of this generator is varied by a Safety Car Heating & Lighting Co.'s generator regulator, so as to maintain the voltage of the small set substantially constant. This insures charging the battery at the proper rate regardless of its condition, in addition to carrying compressor, light, or other 32-volt loads, as necessary, without danger of overcharging the battery. It is felt that this arrangement will contribute materially to the reliability of the apparatus, and particularly to the life of the battery. Furthermore, this small set can be operated at any time, whether or not the large plant is operating, making it possible to completely shut down the large engine in coasting down grade. Also, the small plant can be used for charging the air system before starting the main engine, and for recharging the batteries at terminals.

Both the large and small generators are arranged with suitable starting windings for starting their respective engines. The use of the small engine provides a second source of current for starting the main engine, i. e., the main engine can normally be started from the battery, or from the auxiliary set, although the usual procedure would be to draw from the battery with the auxiliary set assisting.

Fig. 4 shows the speed-tractive effort curves with both the six-cylinder and the eight-cylinder engines. Fig. 5 is the high-voltage wiring diagram, while Fig. 6 shows the low-voltage circuits.

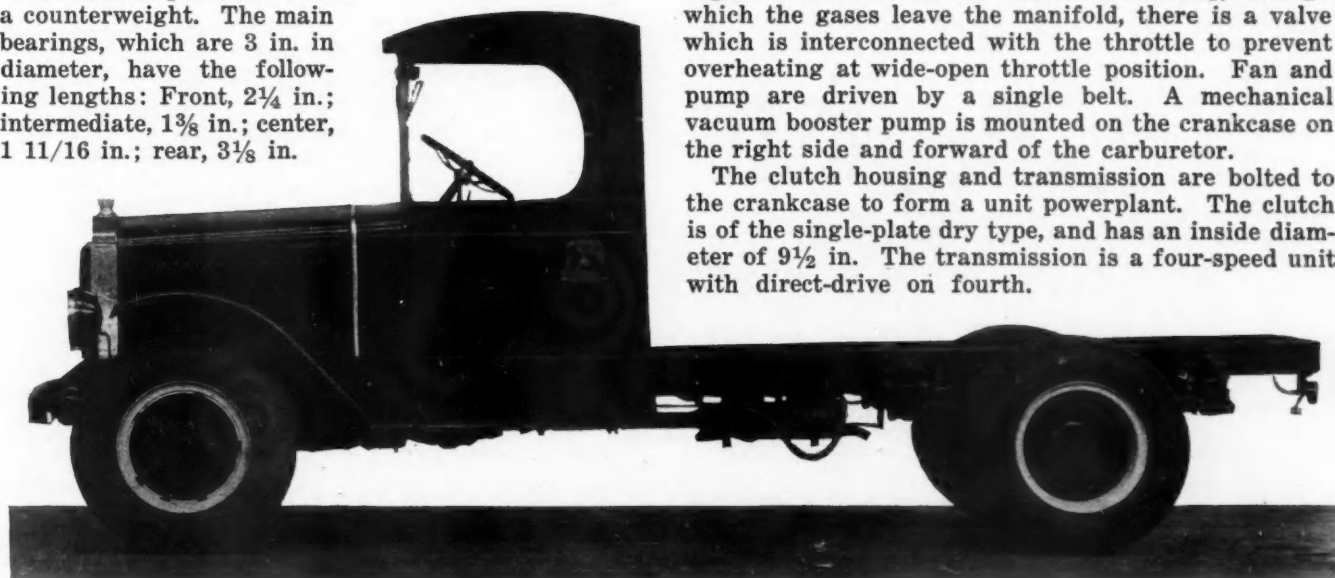
Mack Announces Model BC Truck with 100 h.p. Engine

New chassis has six-cylinder powerplant designed for speeds equal to ordinary passenger car traffic on country roads

A NEW six-cylinder truck designed to keep up with ordinary passenger car traffic on country roads is the latest addition to the line of Mack Trucks, Inc. It is known as the Model BC, and will be supplied with either chain drive or double-reduction gear drive at the option of the purchaser. The engine has a bore of 4 in. and a stroke of $5\frac{1}{2}$ in. and develops 100 hp. at 2400 r.p.m. The rear axle ratio is 6.69 to 1, which is quite low for a truck of this capacity. Four-wheel internal brakes are operated by a vacuum booster. A combined fan and water pump, mounted at the front of the cylinder block, crankcase ventilation, throttle control of the exhaust heat applied to the inlet manifold through a jacket on the riser, and a high-pressure oiling system, are a few of the interesting features of the new six-cylinder engine.

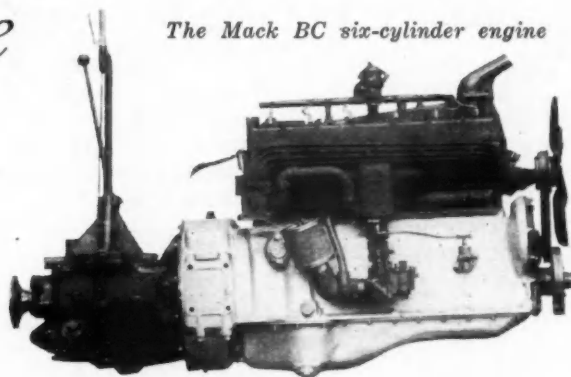
With a displacement of 414 cu. in., the engine develops a maximum torque of 276 lb.-ft. at 1400 r.p.m. The power output is 95 hp. at 2000 r.p.m. and 100 hp. at 2400 r.p.m. The compression ratio is 4.8 to 1. The cylinders are cast in a single block with a separate single head. Pistons are of cast iron and light in weight; they are 5 in. long and carry three $\frac{1}{8}$ -in. compression rings and one $\frac{3}{16}$ -in. oil ring. The piston pin bosses are diamond-bored. The piston pins, which are full-floating, are $1\frac{1}{8}$ in. in diameter and $3\frac{5}{8}$ in. long.

The crankshaft is mounted in seven main bearings, and is made of low-carbon steel, case-hardened. Each crank arm is provided with a counterweight. The main bearings, which are 3 in. in diameter, have the following lengths: Front, $2\frac{1}{4}$ in.; intermediate, $1\frac{3}{8}$ in.; center, $1\frac{11}{16}$ in.; rear, $3\frac{1}{8}$ in.



Mack Trucks, Inc., BC chassis designed for traffic of passenger car speed

The Mack BC six-cylinder engine



Connecting rods are tubular, machined all over, and are made of drop-forged molybdenum steel. Bearings are direct-babbitted and are diamond-bored, the diameter being $2\frac{1}{2}$ in. and the length $1\frac{13}{16}$ in.

The camshaft, which is $1\frac{1}{4}$ in. in diameter, is mounted in four bearings. The valves have flat seats and are located on the right-hand side. Inlet valves are made of chrome-nickel steel and exhaust valves of chrome-silicon steel. Ignition is by battery and distributor with semi-automatic advance. The electrical system is of the 12-volt type and of North-East make.

There is a by-pass to the path of the cooling water through the jacket space. When the temperature of the jacket water drops below 150 deg. no water circulates through the jacket, and circulation begins again when the jacket temperature rises above 175 deg.

Crankcase ventilation is provided by a flexible tube extending from the valve cover plate to the elbow on the carburetor air intake. Air entering the carburetor is filtered through an Air Maze cleaner. The pressure lubrication system operates under a pressure of 55 lb. p. sq. in., and extends to main, connecting rod and camshaft bearings. An H.W. Filtrator is included in the oil circuit. The inlet riser above the carburetor is heated by exhaust gases which are taken from the end of the engine exhaust manifold. Inside the casting, through which the gases leave the manifold, there is a valve which is interconnected with the throttle to prevent overheating at wide-open throttle position. Fan and pump are driven by a single belt. A mechanical vacuum booster pump is mounted on the crankcase on the right side and forward of the carburetor.

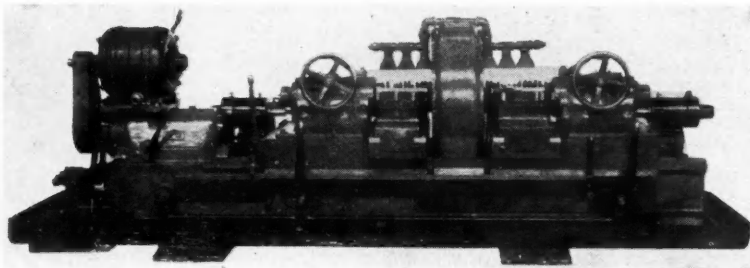
The clutch housing and transmission are bolted to the crankcase to form a unit powerplant. The clutch is of the single-plate dry type, and has an inside diameter of $9\frac{1}{2}$ in. The transmission is a four-speed unit with direct-drive on fourth.

NEW DEVELOPMENTS—Automotive

Crankshaft Turning and Facing

THE machine illustrated by the accompanying two photographs was specially designed for facing the sides and ends, and rough-turning the arms of two-throw crankshafts used in a two-cylinder opposed tractor engine. The manufacturer of this crankshaft lathe is the Foster Machine Co. of Elkhart, Ind.

The driving unit or head rotates in large ball bearings, with a bore of 21 and an outer diameter of 27 in.



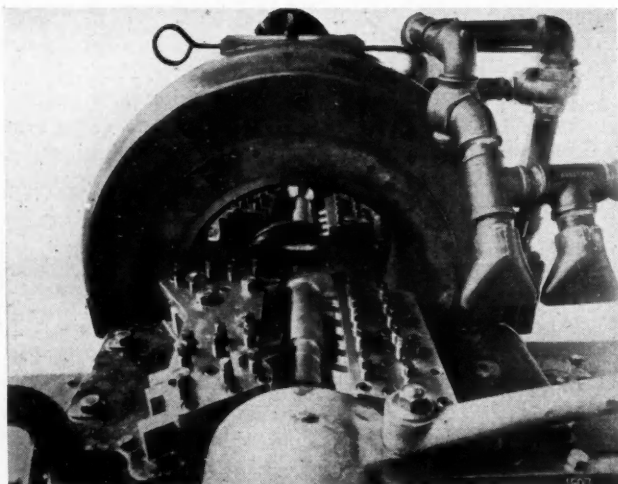
Foster special crankshaft lathe

It is driven through a pair of herringbone gears. Speed changes are made available by a gearbox at the head end of the machine, where a 20 hp. motor is located.

The crank is supported on four centers, two of which are carried in an adjustable block dovetailed into the driver. The centers located in the tail stocks revolve on roller bearings, and are movable through the manipulation of the handwheels.

The entire tooling is carried on four slides, two of which are cross feeding, and complete the facing operations on the ends, sides and shoulders. The second pair of slides feed longitudinally and effect the turning operations along the length of the arms. At the completion of operations the entire tooling rapidly moves to the original starting position and stops clear of the work. The longitudinal-moving slides back outward from the work before starting on their return movement.

The entire feeding mechanism is hydraulically operated and automatically controlled, a separate motor



Showing arrangement of tooling on special crankshaft lathe

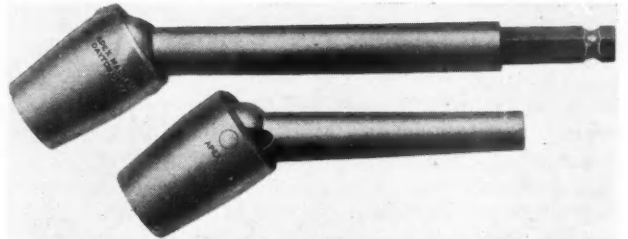
being used for driving an Oilgear, from which the pressure medium is obtained.

The cranks have arms 8 and 12 in. long and approximately $3\frac{1}{4}$ in. in diameter, and in test runs all operations were completed in $2\frac{1}{4}$ minutes.

Apex Nut Setters

APEX universal joints have been adapted to setting nuts and cap screws in inaccessible places, the socket end of the joint being made to fit over the nut, and the shank on the ball end being made to specifications as to length, shape, etc. With this tool it is said to be possible to set nuts tight enough in one operation that are ordinarily first run down and then tightened in a second operation.

These tools are made of alloy steel and will operate up to 30 deg. The illustrations show the straight shank for welding to hand braces and the special long shanks with hexagon end for use in portable tools. These joints are manufactured by the Apex Machine Co., Dayton, Ohio.



Apex universal joint nut setters

Four-Spindle Automatic

TWO new four-spindle automatics designed to simplify screw machine set-up and tooling were shown by Greenlee Bros. & Co., Rockford, Ill. Built low and compact, they save much of the operator's time in getting at the tools. Very little coolant piping is exposed, the piping being built into the interior of the spindle carrier assembly and the tool and forming slides. This arrangement, together with the open construction of the spindles and slides, makes it easy for the operator to change set-ups, etc. These improvements are said to reduce the operator's work and automatically increase his efficiency.

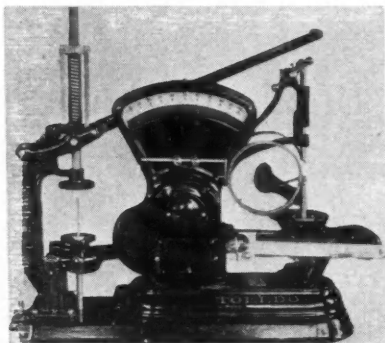
The range of work which these machines can turn out is wide, due to the design of the forming slides—each slide being individually cammed for independent operation. In addition, the tool slide permits the use of end-working tools in all positions, because the stock feed occurs between the fourth and first positions. All threading and tapping can also be handled in either or both the third and fourth positions.

The usual tool slide camming is not used on the Greenlee machine. Instead, the slide is controlled by rack and intermitting gearing, insuring smooth feed. An adjusting dog on the feed worm gear takes care of all setting for the various feeds.

Parts, Accessories and Production Tools

Toledo Piston Ring Gage

ONE of the products of the recently organized Toledo Precision Devices, Inc., Toledo, Ohio, will be a combination piston ring and valve spring auto-gage. It



Toledo piston ring and valve spring auto-gage

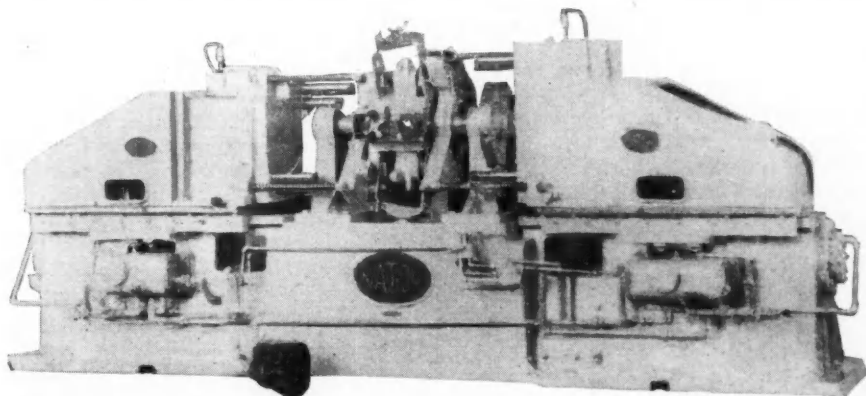
is designed to compare the strength of piston rings, that is, the pressure which they exert against the cylinder wall, and to gage the pressure of valve springs when compressed to certain lengths. The device is intended for use by engine makers and manufacturers of piston rings and valve springs.

As will be seen from the illustration, the gage comprises a weighing scale with means for applying a weight or load to it through a piston ring on one side of the scale and through a valve spring on the other. The load capacity is 15 lb. for piston rings and 150 lb. for valve springs. There is a double dial scale reading to 10 lb. in 1/10 lb. graduations (black) for piston rings, and to 100 lb. in 1 lb. graduations (red) for valve springs. There is only one line of graduations, but there are two lines of figures, one below and the other above the graduations. The beam similarly has one line of graduations and two lines of figures, reading to 5 lb. in 1/10 graduations for piston rings, and to 50 lb. in 1 lb. graduations for valve springs.

A bracket and adjustable holders for piston ring bands up to 7 in. diameter rings are furnished.

Transmission Case Operations

FOUR operations are being performed on a transmission case in the equipment shown at the rate of 60 pieces per hr. The operations consist of: first,



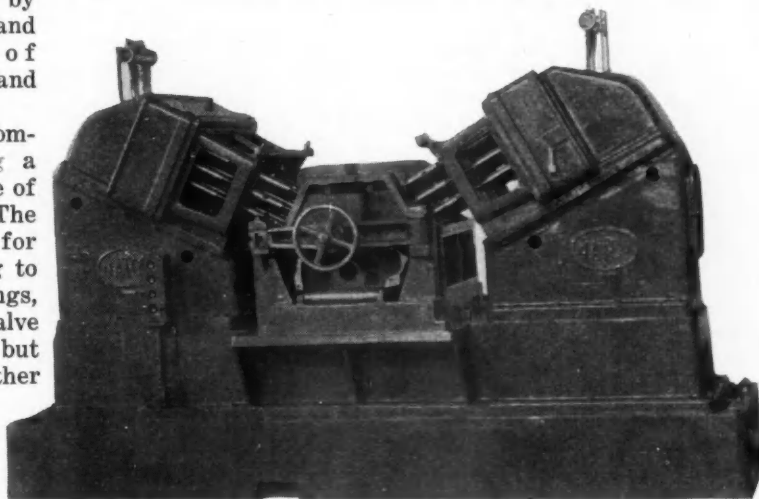
A production of 60 pieces per hr. is possible on the horizontal hydraulic driller pictured above

drill three holes, one from the right-hand side and two from the left; second, drill two holes from the left-hand side; third, counterbore one hole from one side and ream two from the other side; fourth, ream two holes from the right-hand side.

The equipment used is built up of two standard Natco type C-6 hydraulic drill units supplied by The National Automatic Tool Co., Richmond, Ind. The hydraulic feed is semi-automatic in operation. A special trunnion type fixture is employed to support the transmission case.

Forty-Hole Tapping Operation

IN a plant making eight-cylinder engines, 40 holes are tapped in the block in a single operation by means



Tapping 40 holes in an eight-cylinder engine block in one operation

of the equipment shown in the accompanying illustration. The machine is built up of two angular heads with individual lead screws to each tap. It was built by The National Automatic Tool Co., Richmond, Ind.

The machine is operated by four push buttons at the left side of the machine and is driven by a 25 hp. reversing motor. Each head is fitted with a fixed center, gear driven cluster box containing 20 spindles complete with lead screws, lead screw plate and tap holders.

Twenty holes are tapped in each angular face of the cylinder block at the rate of 70 blocks per hr.

Ohio Shaper

THE 36-in. Super-Dreadnaught is a new shaper offered by the Ohio Machine Tool Co., Kenton, Ohio. This machine is designed to cover a wide range of work from a slow, heavy hogging cut to a fine finishing cut at high speed. It has a quick change speed box and clutch and brake. Lubrication is forced feed, full automatic.

First with
the News

Reliable,
Accurate

News of the Industry

PAGE 628

VOLUME 61

Philadelphia, Saturday, October 26, 1929

NUMBER 17

Steep Seasonal Decline Is Reported In Industry

PHILADELPHIA, Oct. 24—Automobile production has been experiencing a seasonal decline of a steeper nature than last year, because of the output and sales records established earlier in 1929. September was the first month, however, in which the total production, cars and trucks, for the United States and Canada, fell below the figure for the same month last year.

September production of motor vehicles in the United States and Canada, as reported by the Department of Commerce, was 429,149, as compared with 436,507 produced during September, 1928, a drop of 7358 units. Nine months' production this year totaled 4,871,324, compared with 3,672,871 produced during the first nine months of last year, a gain of 1,198,453 vehicles.

It appears doubtful if the October production total will equal that of September, 1929. Ford's announced schedule of production for the remainder of the year, indicates a drastic curtailment of approximately 50 per cent of his October production.

Passenger car sales for the United States in September are estimated to have been 15 per cent in excess of the number listed for that month last year. It is believed that the figure for September, 1929, will be around 315,000, as compared with 272,000 for September, 1928. August sales of passenger cars were 14 per cent in excess of those of the same month in 1928.

Milady's Styles Dominate Bodies

DETROIT, Oct. 24—Back to nature movements, as evidenced by the scantiness of feminine wearing apparel, is responsible in part for the great movement toward convertible automobile bodies, according to L. Clayton Hill, vice-president and general manager of Dietrich, Inc., in an address last night at a meeting of the Society of Automotive Engineers here. This movement is so pronounced that Mr. Hill believes that the day will come when the convertible car might be produced as a leading unit on a mass production basis within the low-priced field.

Aero C. of C. Has Big Session

WASHINGTON, Oct. 24—Exceeding expectations from point of attendance, the joint conference arranged by the Aeronautical Chamber of Commerce of



Harlow H. Curtice

who was elected president of the AC Spark Plug Co., Flint, Mich., succeeding his former chief, Basil W. de Guichard, resigned. Mr. Curtice joined the company 16 years ago, and after one year with the concern became comptroller, at the age of 21. He became vice-president and general manager in 1927.

America and the American Road Builders' Association opened a two-day session at the New Willard Hotel here this morning with approximately 200 present, coming from all sections of the United States.

Pierce-Arrow Reports Earnings

BUFFALO, Oct. 24—The Pierce-Arrow Motor Car Co. reports net profit for the nine months ended Sept. 30 of \$2,456,673, or \$10.63 a share, on Class A stock after preferred dividends.

Tool Industry May Break All Records

Builders Predict 1929 Will be
Banner Year for all
Time in Sales

BRIARCLIFF MANOR, N. Y., Oct. 23 (*Special to Automotive Industries*)—Prediction that the 1929 business volume of the member companies of the National Machine Tool Builders' Association will exceed that of the post-war boom year of 1920, and probably even that of 1919, was voiced at the Twenty-eighth Annual Convention of that organization, which closed here tonight. The gathering was convened Oct. 21.

Orders received this year by member companies to the end of September apparently totaled in value the aggregate of all they obtained in the year 1928. The total value of orders received by the companies in the last 18 months exceeds slightly in value those recorded for the post-war boom period of 1919-1920, it was announced.

The 150 delegates in attendance at the sessions voted that the next National Machine Tool Exposition shall be held in the middle of September, 1932, in Cleveland and every three years thereafter. Officers elected at the convention were:

President, C. A. Johnson, president of Gisholt Machine Co., Madison, Wis.; first vice-president, H. W. Dunbar, works manager, Norton Co., Worcester, Mass.; second vice-president, Robert M. Gaylord, president, Ingersoll Milling Machine Co., Rockford, Ill.; treasurer, Frederick V. Geier, vice-president, Cincinnati Milling Machine Co., Cincinnati, Ohio. Directors elected for three-year terms: Robert M. Gaylord; G. E. Randles, president, Foote-Burt Co., Cleveland, and C. R. Burt, vice-president and general manager, Pratt & Whitney Co., New York. The holdover directors are: J. E. Andress, president, Barnes Drill Co., Rockford, Ill.; E. J. Fullam, secretary and treasurer, Fellows Gear Shaper Co., Springfield, Vt., and H. E. D. Gray, Landis Tool Co., Waynesboro, Pa.

The convention consisted of general meetings and group discussions. Papers read before sessions of the convention included one entitled "Business Needs to Analyze Distribution Costs," by W.

B. Castenholz, of LaSalle Extension University, and "Industrial Statistics as Tools of Business Management," by Dr. Virgil Jordan, economist of *The Business Week*.

Holds Business Papers Best Serve Industries

CHICAGO, Oct. 21—Business papers can serve an industry much better than official organs of that industry's trade associations, Alfred Reeves, general manager of the National Automobile Chamber of Commerce, said, speaking before the National Conference of Business Papers Editors at the Blackstone Hotel today.

In the first place, a trade association must keep its members informed instantaneously of all developments and cannot await publication dates. Further, trade association executives have a specific job and the publication of an organ is likely to detract from their other activities. The house organ must be paid for and even though it may be a legitimate advertising medium members may feel that their advertising payments are in the nature of dues and contributions.

Expects Big Truck Sales

DETROIT, Oct. 21—Retail sales of trucks and commercial cars promise to maintain an unusually high seasonal volume for the remainder of the year, according to Howard E. Sneathen, director of Dodge Bros. truck sales, who has just returned to Detroit after a five weeks' visit to representative dealers of the country.

Produce 5,805,804 Tires

NEW YORK, Oct. 23—Tire manufacturers in the United States produced 5,805,804 pneumatic casings during August, according to estimates of the Rubber Manufacturers' Association. Production of inner tubes was estimated at 5,846,402, and that of solid and cushion tires at 42,818. Inventories on Aug. 31 were estimated as 14,225,820 for all pneumatic casings, 14,156,770 for inner tubes and 156,410 for solid and cushion tires.

To Lay Airship Ring

AKRON, Oct. 24—The master ring of the projected Navy airship ZRS4 will be laid at a ceremony to be held at the Goodyear-Zeppelin plant here, Oct. 31. When completed, the airship will have a capacity of 6,500,000 cu. ft., will be 785 ft. long, and 146 ft. high. The skeleton is of duralumin. The ZRS4 and its projected sister ship, the ZRS5, will be the two largest airships in the world.

M.E.A. Show to be Largest

CHICAGO, Oct. 24—The Coliseum here will be filled to capacity with the largest exhibit of automotive products at the time of the Motor and Equipment Association's eleventh annual International Exposition of automotive products to be held from Nov. 4 to 9.

Litle Quits Marmon; in Consulting Work

Former Chief Engineer Will
Continue to Serve as
Adviser

INDIANAPOLIS, Oct. 23—Thomas J. Litle, Jr., for the last three years



Thomas J. Litle, Jr.

chief engineer of the Marmon Motor Car Company, has announced his resignation from that post, effective Jan. 1, to enter the professional field as engineering counsel and industrialist. He will be succeeded by George Freers, for 17 years a member of the Marmon engineering staff and for five years assistant chief engineer.

Hal L. Purdy, vice-president and general manager was elected to the position of chairman of the executive committee. Mr. Purdy joined the Marmon organization in 1915 and rose rapidly to the general managership of the company. He was at one time production supervisor of the Packard Motor Car Co.

Mr. Litle, who has been closely associated with Henry Ford in addition to being engineering executive of the Lincoln and Marmon companies, vice-president of the Copeland Electric Refrigerator Co. and president of the S. A. E. will maintain offices both in Detroit and Indianapolis. Marmon will be his first client, G. M. Williams, president said.



George Freers

Mr. Litle is considered an international engineering authority, his articles appearing frequently in the American and foreign

press and in technical journals. He recently perfected his 225th invention, the vibration modulator, now used on all Marmon straight-eights.

General Motors-Fokker Group to Build Dorniers

NEW YORK, Oct. 24—The Dornier Corp. of America, for which papers of incorporation were filed in Wilmington yesterday, has been organized by General Motors Corp. and Fokker Aircraft Corp. of America, to carry out the manufacture of flying boats under Dornier design and patents. General Motors Corp. entered into an arrangement with Dornier several months ago for this purpose.

Hupp Sets October Record

DETROIT, Oct. 24—Shipments of Hupp Motor Car Corp. this month will set a new October record and will total in excess of 5500 cars, according to R. S. Cole, vice-president in charge of sales. This will exceed shipments of 4129 cars in October last year by more than 35 per cent. Retail sales so far this month have sustained the high rate of shipments it is said.

To Enter Slow Airplane

NEW YORK, Oct. 24—Embodying several novel principles and mechanical innovations, an airplane designed by Vincent J. Burnelli of the Uppercu-Burnelli Corp. of Keyport, N. J., to compete for the \$150,000 in prizes offered in the Safe Aircraft Competition of the Daniel Guggenheim Fund for the Promotion of Aeronautics, will take the air within a few days for test flights.

Automotive Advertising Leads

NEW YORK, Oct. 21—In an analysis of national advertising in newspapers of 77 large cities, Sales Management found that automotive space led all other classifications with nearly a third of the total lineage. Automobiles, tires, gasoline and other automotive products totaled 161,105,000 lines. Chevrolet headed the automotive list, followed closely by Buick, Chrysler, Studebaker, Nash, Dodge, Overland-Whippet, Ford and Pontiac.

Expects Receivership to be Lifted

ST. LOUIS, Oct. 23—The Johnson Lock Co. expects to be relieved of its temporary receivership within six months, according to R. A. Kaltwasser, receiver. The plant is operating at capacity and will soon announce a new gear shift lever for four-speed transmissions. Resources are said to be considerably in excess of liabilities.

Creates New Department

DETROIT, Oct. 22—The Campbell-Ewald Co., advertising agency, has created a department of service management under the supervision of Guy C. Brown and W. A. P. John, vice-presidents.

M.E.A. Index Feels Production Slump

Original Equipment Recession
is Reported, But Parts
Business is Good

NEW YORK, Oct. 23—Reduced automobile production schedules for the remainder of the year have had their effect on original equipment manufacturers, according to the Motor and Equipment Manufacturers Association, who report a September business index for this group of manufacturers of 186 as compared with 193 in August and with 218 in September a year ago, this index being based on January, 1925, as 100. It is expected that the remaining months of the year will show indices at least below those of the earlier months of the year and possibly falling behind the corresponding indices for last year.

Service parts manufacturers show an improvement over the earlier months of the year, establishing an index of 173 as compared with 169 in August, but are below last year when the index for September was 185. September index this year was the highest for the year with the exception of April when the index was 174.

Panama-Texas Road May be Opened in Five Years

WASHINGTON, Oct. 23—Delegates of the Pan-American Confederation for Highway Education from seven countries and the Canal Zone at the recent session in Panama set five years as a maximum period within which highways communication would be opened from Texas to Panama, according to a radiogram received by the Confederation here from Pyke Johnson, executive director of the Confederation and secretary of the Highway Education Board. The radiogram, received through the courtesy of the Department of Commerce, quoted J. Walter Drake as saying the session opened a new era in relations between the nations of America.

Plans New Aero Concern

KANSAS CITY, Oct. 23—Formation of a \$30,000,000 aviation, manufacturing and air express corporation with headquarters in Kansas City, St. Louis or Chicago is proposed by officials of the Aircraft Finance Corp. of Los Angeles, here today to confer with aeronautical interests here. O. K. Hunsaker, secretary of the corporation, said plans of the venture called for purchase of controlling interest in six or eight airplane factories, making planes of all sizes and types.

Announce Body Corporation

SPOKANE, WASH., Oct. 24—Purchase of an interest in the Modern Auto Body Works, Spokane, by H. G. Thompson and incorporation of the business as the Modern Auto Body

Photo-Electric Cells Used to Control Traffic Shown in Westinghouse Booth

NEW YORK, Oct. 17—At the National Electrical Exposition, which was held last week at the Grand Central Palace, attention was attracted by a model exhibit of a system of automatic traffic control, invented by Dr. Phillips Thomas of the Westinghouse Electric & Manufacturing Co. of Pittsburgh. It is based on the use of photo-electric cells, which are buried in the road and covered by a glass bullseye at a place where a vehicle waiting for the traffic light to change would stop. The system is applicable to any of the present systems of traffic control by luminous signals.

Should the photo-electric cell, or the "electric eye" as it has been called, become inoperative for any reason, the signals will work as usual, opening the main highway and the crossroad alternately. We understand that the system has been installed experimentally on a section of road in East Pittsburgh.

Among the exhibits of the Bakelite Corp. were a number of articles of an automotive character. Bakelite is ex-

tensively used for the distributor covers of magnetos and battery ignition units, and the distributor cap for a 12-cylinder Scintilla magneto for aircraft work was shown. The Bakelite Corp. recently has developed a molding material which has both a higher specific resistance than the ordinary Bakelite (10^5 - 10^7 instead of 10^4 - 10^5 megohms per centimeter cube), and also will not char so readily under arcing. This new molding material also can be more readily molded into complicated forms. Bakelite is coming into use for steering wheels and for interior trim, such as window sill moldings. Likewise, Bakelite lacquers are coming into use for finishing automobiles. These lacquers are air-drying and can be used with different colors. Bakelite lacquers can be applied by brushing or dipping, and by means of the air gun.

Mr. Martin of Bishops Wire & Cable Corp., 425 E. Twenty-fifth St., New York, exhibited an electric insulated cable which when pressed by the fingers establishes an electric contact.

Works, Inc., was announced recently by S. H. Lewis, who founded the business in 1918. Growth of the business and contemplated expansion are given as the reason for the change in organization.

Approve Continental Engine

DETROIT, Oct. 24—With a perfect score and a record of no forced stops and no penalties, the aviation engine of the Continental Aircraft Engine Co. recently passed the test for the approved type certificate required by the government, it was announced in Washington by the Department of Commerce. Eleven companies placed orders before the tests, and deliveries of the engines will be made at once, according to Robert Insley, president.

Will Use New Diesel Bus

NEW YORK, Oct. 24—Public Service Coordinated Transport, New Jersey motor bus-operating company, will shortly place in experimental operation on a route in its Essex division, a bus fitted with a Mercedes-Benz Diesel engine. An engine of this type was exhibited at the recent Atlantic City show of the American Electric Railway Association, but the Public Service experiment is said to be the result of a visit to Germany of two of its officials in 1928, where they saw motor trucks with Diesel engines in successful operation.

City Machine Takes Option

TOLEDO, Oct. 24—The City Machine & Tool Co. has taken an option on a 30-acre tract. This company has outgrown its present rented quarters, and plans are said to be under way for building its own plant.

Business in Brief

Written by the Guaranty Trust
Co., New York, exclusively for
AUTOMOTIVE INDUSTRIES.

NEW YORK, Oct. 24—During the last week there was some falling off in activity in the heavy industries. Building activity declined, and there was a loss in trade in some sections of the steel industry.

EMPLOYMENT

Employment during September, according to a report issued by the United States Department of Labor, increased 0.8 per cent, as compared with that during the preceding month, while pay-roll totals increased 1.2 per cent.

ELECTRIC CONSUMPTION

Industrial activity in September, based on the consumption of electrical energy by manufacturing plants, was 7 per cent above that in the preceding month and 1 per cent above that in the corresponding month last year.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended Oct. 19 stood at 94.6, as against 94.7 both for the week and two weeks before.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended Oct. 16 showed an increase of \$27,000,000 in holdings of bills bought in the open market, while there were decreases of \$8,000,000 in holdings of discounted bills and of \$3,000,000 in holdings of Government securities.

Chain of Garages Planned for Cities

Large Structures for Populous Areas Promoted by Chicago Group

PHILADELPHIA, Oct. 24—Huge parking and service garage structures, to be built in the downtown areas of large cities, is the plan of the newly-organized Ruth Safety Garages, Inc., Chicago.

Preliminary plans, announced this week as the 28-story garage at Plymouth Court, Chicago, is under construction, call for buildings in New York, Chicago and Philadelphia as well as other cities where population seems to require structures of this type.

Among automotive construction plans announced this week and jobs under way were:

New York City Airport, Inc. (Halleran Agency, Flushing, L. I.), acquired 305 acres for airport, with facilities for seaplanes. Plans will be prepared for hangars for 100 airplanes, machine and repair shop, etc., to cost \$750,000.

J. S. Kennedy, Brooklyn architect, plans eight-story automobile service and repair garage, to cost \$300,000 with equipment.

Cleveland Railway Co., Cleveland, awarded contract to A. A. Lane Construction Co., for new coach shops to cost \$100,000 with equipment.

Buckley Aircraft Co., Wichita, Kan., considering plant near airport for parts production and assembling, to cost \$45,000 with equipment.

General Aviation Co., Syracuse, N. Y., plans removal to Elmira, N. Y. New hangar with repair and reconditioning facilities will be constructed.

Motor Transit Management Co., Chicago, plans for automobile service, repair and garage building at Syracuse, N. Y., to cost \$100,000.

Cochrane Chevrolet Co., Bridgeport, Conn., plans addition to service, repair and sales building, to cost \$100,000 with equipment. (Fletcher-Thompson, architect.)

Sikorsky Aircraft Co., Lordship, Bridgeport, Conn., plans addition to cost \$90,000 with equipment. (Fletcher-Thompson, Inc., is architect.)

Crosley Aviation Co., Cincinnati, awarded contract to Austin Co., Cleveland, for building.

Delco Products Co., Dayton, Ohio, plans new seven-story unit, to cost \$200,000 with equipment.

AC Spark Plug Co., Flint, Mich., planning three-story addition, to cost \$100,000 with equipment.

City Council, Tampa, Fla., planning municipal airport at Ballast Point, Hillsborough Bay district, to cost \$700,000 with hangars, repair and reconditioning shops, oil storage and other units. Special election has been called on Nov. 16 to approve bonds for \$750,000.

Bendix Aviation Corp., South Bend, Ind., awarded contract to H. G. Christman & Co., for addition to cost \$450,000 with equipment.

Fokker Aircraft Co., Glendale, W. Va., awarded contract to Eaves Construction Co., Los Angeles, for new airplane manufacturing plant near El Monte, Cal., adjoining airport of Western Air Express, to cost \$300,000 with equipment.

Record for Glider Broken by Dinort

BERLIN, Oct. 20—Lieutenant Dinort, flying a so-called "slow sailplane," today established a new glider duration record by remaining in the air 14 hours and 45 minutes over Rositten Field in East Prussia, excelling the record of the late Ferdinand Schultz by more than 35 minutes.

Cologne Will Be Ford European Headquarters

COLOGNE, Oct. 18 (Special)—A contract was signed today between Mayor Adenauer of Cologne and the Ford Motor Company providing that the Ford European headquarters shall be transferred to Cologne.

A factory will be erected on the banks of the Rhine, which will be Ford's only manufacturing plant in Europe, the other plants being merely for assembling.

At the beginning, 1000 workmen will be employed but the plant will be gradually expanded, according to requirements. The production program includes baby cars as well as the ordinary Ford car and trucks of every type.

Aviation Financing Gains

NEW YORK, Oct. 23—Offerings of securities by 82 aviation companies during the year ended on Aug. 31 totaled \$248,200,000, according to a statistical study made by Air Investors, Inc.

U. S. Lead is Unchallenged

WASHINGTON, Oct. 23—Little possibility is seen of any serious change in trade relations between the United States and Latin-American countries, because approximately 80 per cent of Latin-American imports from the United States are mass-produced commodities, without a rival as to price and quality, George J. Eder, of the division of regional information, Department of Commerce, reported. A large share of the purchases from the United States consist of automobiles and trucks, electrical appliances, phonographs, and agricultural machinery.

Budwig is Promoted

WASHINGTON, Oct. 24—Capt. Gilbert G. Budwig, formerly chief of inspection of air regulations division, Department of Commerce, has been appointed assistant director of aeronautics of the department.

Amtorg Buys Order of Presses

TOLEDO, Oct. 24—The Toledo Machine & Tool Co. has been awarded a contract for 150 large presses, to cost about \$1,000,000, by Amtorg Trading Corp., to be used for automobile production in Russia.

Automotive Steel Orders Are Slow

Manufacturers' Material Inventory Apparently is Lowest in Years

NEW YORK, Oct. 24—Specifications and fresh orders from automotive consumers are generally thought to lag somewhat behind the current rate at which steel is being absorbed by motor car output, stocks in consumers' hands being apparently whittled down to the very bone.

These have never been very large this year, and steel producers are confident that, at the very first sign of expanding production schedules in automotive plants, the change will be reflected in their order books. Meanwhile the market is marking time.

The market for cold-rolled strip is fairly steady. There has been some talk of hot-rolled bar prices showing signs of weakening, but the rather light transactions of the last few days show no out-and-out recession in prices. Cold-finished bars continue to be quoted at 2.30 cents, Pittsburgh. Demand is very quiet and that for automotive alloy steels is almost dormant for the time being. As to the market's long range outlook, one need but look at the inquiries which railroads are putting out for automobile cars, the Frisco being in the market for 500 and eastern roads having placed correspondingly good-sized orders.

Pig Iron—The Michigan market is easier, chiefly as the result of competition between Chicago and Ohio furnaces, the quotation now being \$19.50.

Aluminum—Automotive demand is light. The market is quotably unchanged.

Copper—Steady at unchanged prices.

Cars Have Larger Cooling Systems

NEW YORK, Oct. 25—The increasing use of six and eight cylinder cars together with the added power that has resulted from the past year's automotive developments has brought about important changes in automobile cooling systems. The new chart of radiator capacities issued by the Glycerine Producers' Association shows that the average cooling system in the 1930 models holds from one to four qt. more liquid than cooling systems in the same make car of a year ago. Among the 1928-29 cars listed in the chart, the Durant 40 M-4 has the smallest radiator capacity—8 qt., while the Rolls-Royce Silver Ghost has the largest cooling system, holding 36 qt.

Franklin Veterans Meet

SYRACUSE, N. Y., Oct. 24—The "Twenty Years Service Club" comprised of men who have worked continuously for a score of years in the plant of the Franklin Automobile Co. This club is now comprised of about 100 members, the ranks being swelled by 21 new members at this year's meeting.

Hoffman Cites Need of Better Highways

N. A. C. C. Committee Head Says Planning Would Lower Accident Rate

NEW YORK, Oct. 24—Adequate highway facilities properly planned and laid out constitute a material aid not only in improving traffic conditions but also in lowering the accident rate, in the opinion of Paul G. Hoffman, vice-president in charge of sales of Studebaker Corp., and head of the Street Traffic Committee of the N. A. C. C., in a monthly report issued by that body this week.

Mr. Hoffman cites as an example of what is being done in this direction the program being followed by Erie County, New York, which includes Buffalo, two other cities and 25 towns. This program, which was inaugurated about ten years ago and on which active construction was started about seven years ago, has been outlined by George Diehl, county engineer, for the benefit of the bulletin. Specifically, Mr. Hoffman says:

"Better streets will mean better traffic. A city which has a hodge-podge of streets with many bottlenecks and no long range program cannot expect that its citizens will have well-organized driving habits . . . The county-wide system which has been laid out for Erie County will go far toward promoting the smooth flow of traffic which is conducive to safe driving."

Ruxton Shows Roadster

NEW YORK, Oct. 23—New Era Motors, Inc., has on exhibition at the National Business Show in Grand Central Palace this week, a two-passenger roadster. Prices on three standard models, which are expected to start rolling off the assembly soon, are: five-passenger sedan, \$4,500 f.o.b. St. Louis, and the two-passenger roadster and five-passenger phaeton will be \$4,600. There will also be custom jobs.

Financial Notes

Company	Announces	Amount	Remarks
American Bosch Magneto	net profits 9 mos. third quar.	\$927,537.00	1928 period \$362,921
Bohn Aluminum & Brass	net profits 9 mos. net quar. profits	554,175.00	1928 period \$469,467 bef. tax equals \$7.03 per share
Bohn Aluminum & Brass	9 mos. earn. third quar. earn.	2,474,906.00	equals \$1.97 per share
Budd Wheel Corp.	reg. quar. div.	693,327.00	1928 period \$2,472,087
Campbell, Wyant & Cannon	reg. quar. div.	693,327.00	1928 period \$761,826
Central Alloy Steel	third quar. earn.	.25	Nov. 20 record Nov. 15 payable Dec. 1, rec. Nov. 15
Checker Cab Mfg. Co.	9 mos. earn. third quar. earn.	1,342,974.00	1928 period \$1,160,606
Caterpillar Tractor	reg. quar. div.	4,667,251.00	1928 period \$595,944
Douglas Aircraft, Inc.	unfilled orders	817,647.00	1928 period \$165,581
Doehler Die Casting Co.	Oper. profit, 9 mos.	.75	Nov. 25 record Nov. 15 for delivery April, 1930
Electric Storage Battery	distr. \$11 per share on com. & pref., also distr. 100 per cent stock div.	3,260,000.00	1928 period \$540,331
E. G. Budd Mfg.	quar. pref. div. reg. com. div.	803,331.00	Nov. 1 record Oct. 28 Nov. 1 record Oct. 28 pref. stock.
Firestone Tire & Rubber	issue of \$60,000,000.00 cumulative	1% %	1928 period \$36,910,650
General Electric Co.	9 mos. earn.	.25	1928 period \$12,337,952
Hudson Motor Car Co.	9 mos. earn. third quar. earn.	47,965,832.00	Recession of \$0.19 a share
International Harvester	\$1.25	13,443,165.00	Dec. 2 record Nov. 5 before Federal taxes
Jordan Motor Car Co.	net profits 8 mos.	2,821,653.00	1928 period \$2,236,703
Motor Wheel Corp.	9 mos. earn. third quar. earn.	1.25	1928 period \$905,129
Moreland Truck	8 mos. earn. (Aug. 31)	155,178.00	1928 period \$87,959
Sparks-Withington	third quar. earn.	3,305,396.00	Period 1928 \$314,131
Timken Roller Bearing	net quar. profits net profits 9 mos.	872,396.00	equals \$1.55 a share
Vanadium Corp.	extra div. reg. quar. div.	12,180,877.00	equals \$5.06 a share payable Dec. 16, rec. Dec. 2
Waukesha Motors	stock split, 5 for 1 bankers, 1 to be put in treasury	1.00	payable Nov. 15, rec. Nov. 1 stockholder, 1 to be sold to
Winton Engine Co.	9 mos. earn. third quar. earn.	.75	Whole 1928 \$403,130 Period 1928 \$150,449

Martin Announces Truck Designed After "Baby Car"

NEW YORK, Oct. 23—James V. Martin, airplane inventor who recently startled the world with an announcement of a small automobile to be sold in the neighborhood of \$200, has announced that he will start immediate production on a small truck embodying the same principles, to sell for about \$450.

For this purpose the Martin Motor Truck Corp., with a Delaware charter, has been organized with a capital of 300,000 shares of no par common stock. This stock is being sold directly to the public at \$5 a share.

While complete specifications are not yet ready, it is known that the truck will be powered with a conventional four-cylinder engine and will have a 60-in. wheelbase, will have track 12 in. less than the usual track and will weigh

700 lb. It is reported that the truck will be able to do 50 miles per hour and will obtain 45 miles on a gallon of gasoline.

Among the unusual features incorporated in this truck is the suspension, which is by elastic airplane cord rather than the conventional spring.

Olds and Fisher Plants at Lansing Shut Down

DETROIT, Oct. 23—Production has been suspended at the Lansing plants of the Olds Motor Works and the Fisher Body Corp., while about 2000 men are at work shifting equipment from some of the old buildings to new structures built by Olds to care for increased production schedules which are expected to prevail when the factories resume operations. Olds is expected to reenter production about Dec. 1 and Fisher Body about two weeks earlier. At Olds Motor Works, equipment is being transferred to new facilities for several units including the sheet metal, the axle, the plating and the engine plants.

Packard Earnings Gain

DETROIT, Oct. 24—The Packard Motor Car Co. reported a net income for the fiscal year ended June 30, after all charges, of \$25,183,256, equivalent to \$1.86 a share on no par capital stock, or \$8.39 a share, on the old stock which was recently replaced in the five-for-one split-up. This compares with \$21,885,416, or \$7.28 a share, on the old stock of the preceding year.

Whittelsey Plans Heavy Production

NEW YORK, Oct. 24—Whittelsey Mfg. Co., Bridgeport, expects to be in production on 100 American-built Avro-Avians, to be known as the Whittelsey Avian, early in 1930.

Hoover and Ford Honor Edison



Thomas Alva Edison, right, who was honored this week during a world-wide observance of the anniversary of his making the first incandescent lamp. He is seen here with President Hoover and Henry Ford, who was host at the celebration in Dearborn, Mich., and who established the Edison Institute of Technology there, in memory of his friend

Chevrolet to Open Apprentice Classes

DETROIT, Oct. 26—The Chevrolet Motor Co. has announced that it will soon open an apprentice shop in Flint in which a class of 50 picked youths between the ages of 16 and 19 years will begin an educational course in which books will be totally absent. C. F. Barth, vice-president in charge of manufacturing, will have charge of the project which is to be known officially as the Chevrolet Apprentice Shop.

The word "school" is one which Mr. Barth wants permanently dissociated from the undertaking. It is definitely a shop, operated under shop discipline and maintaining shop hours. A new one-story building, 60 by 160 ft., is being constructed to house the shop.

"The apprentice shop is actually a necessity," said Mr. Barth, in explanation. "The Chevrolet Motor Co., like all other manufacturers, has for several years past noted a decrease in good all-around mechanics. When the automobile industry started there was no such shortage. The founders of the industry were themselves super mechanics and in every instance they surrounded themselves with competent all-around men."

Men who are not high school graduates will be required to complete 10,029 hours, approximately four years of training. High school graduates will be expected to complete the training in two-thirds this time. The apprentice will work 50 hours a week and will be paid from the outset with regular increases in salary.

Stutz Has Unusual Insurance

INDIANAPOLIS, IND., Oct. 24—When a Stutz or Blackhawk automobile is stolen, the owner is protected for 30 days against loss of use by an

N.S.P.A. Convention Opens Headquarters

DETROIT, Oct. 19—Robert Macfee, secretary of the National Standard Parts Association, has announced that Convention Headquarters will occupy Parlors G, H, I on the Ballroom Mezzanine floor of the Book Cadillac Hotel, Detroit, Mich., and will be opened on the morning of Thursday, Nov. 7.

All communications regarding show and convention matters should be addressed there, on and after that date.

unusual policy issued by Lloyd's of London, according to Col. E. S. Gorrell, president of the Stutz Motor Car Co. of America. This insurance, free for one year, provides the payment of five dollars a day up to 30 days to reimburse the owner for taxi fares and inconvenience caused by not having his car. It becomes effective on the owner reporting the theft to the proper authorities.

Hudson Increases Safety

DETROIT, Oct. 22—Hudson Motor Car Co. has recently completed alterations and additions to its hospital at a cost of \$115,000 and extended its Safety First educational activities to every department.

These additions have been carried out under the supervision of Dr. Otto Fisher, eminent industrial doctor and safety first educationalist, who is chief of the medical corps at Hudson. His staff includes an assistant, 15 nurses and two ambulance drivers. All of the furniture in the room is built into the walls and corners where dust might collect have been entirely eliminated.

Firestone Issue to Finance Chain

NEW YORK, Oct. 22—Firestone Tire & Rubber Co. is offering the public \$60,000,000 worth of 6 per cent cumulative preferred Series A stock with stock purchase warrants at \$99 a share. This offering is made through a banking syndicate comprised of Otis & Co., Cleveland Trust Co. and the National City Co.

Proceeds from this issue will be applied for the retirement of existing issue of 6 per cent cumulative preferred and 7 per cent cumulative preferred stock now outstanding, the retirement of 10-year 6½ per cent bonds of the Firestone Park Land Co. and for financing the company's chain of retail service stations.

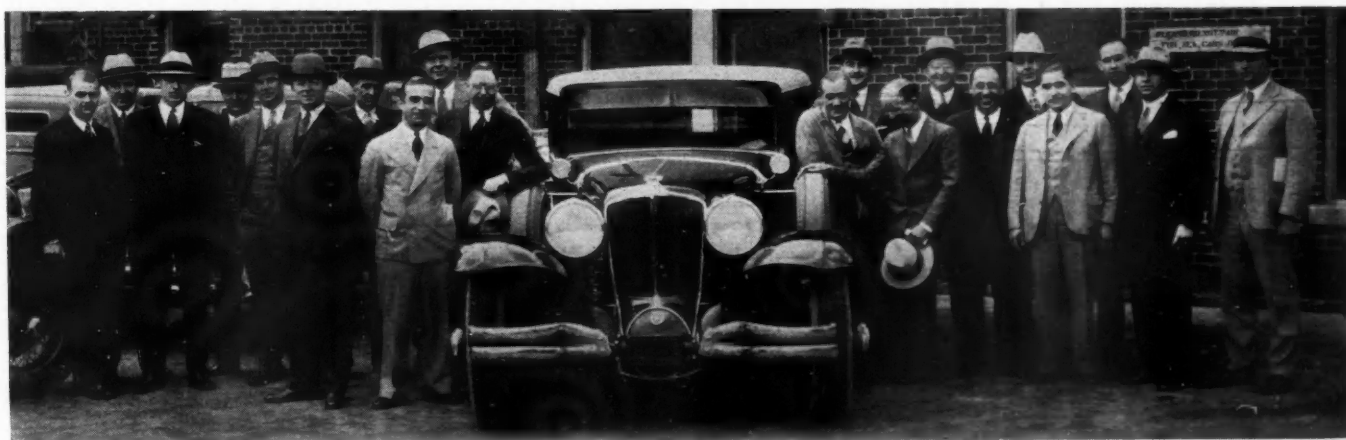
The stock purchase warrants are non-transferable prior to Sept. 1 next and entitle holders to purchase one share of common, as it will be constituted after the payment of the common stock dividend, for each share of preferred, at \$55 a share on or before Jan. 1, 1932; \$65 a share for the next year; \$80 a share for the following year and \$100 a share thereafter until Jan. 1, 1935.

The company has also declared a 400 per cent stock dividend.

Evans Loading Sales Gain

DETROIT, Oct. 16—Net sales of the Evans Auto Loading Co., Incorporated, maker of automobile loading material, wood and metal parts and storage battery separators during the third quarter of 1929, were approximately 30 per cent greater than for the same period in 1928 and exceeded those of the second quarter of this year by approximately 25 per cent, according to E. E. Evans, president.

Auburn Sales Executives Plan Fall Program



Preparing for fall business, district managers of the Auburn Automobile Co. met at the factory recently to lay merchandising plans. Left to right, K. D. Tracy, sales department; C. L. Dunham, district sales manager; H. L. Brink, sales manager; Frank Sheadle, district sales manager; Joseph J. Grant, special factory representative; A. H. Campbell, district sales manager; W. F. Van Pelt, district sales manager; John Marco, special factory representative; N. E. McDarby, director of sales; J. D. Aldrich, district sales manager; Jerry Wonderlich, sales engineer; A. L. Bruyneel, district sales manager; Earl Cooper, sales engineer; R. M. MacIntyre, district sales manager; A. G. Schillo, sales engineer; A. C. Lynch, district sales manager; A. S. Davis, district sales manager; Don Butler, assistant sales manager; R. M. Morris, district sales manager, and Bert Reid

Men of the Industry and What They Are Doing

Many Americans Visit Paris Automobile Salon

The following were among the executives of the American automotive industry who visited the Paris Salon: John N. Willys, chairman, Willys-Overland Co.; H. M. Salisbury, export manager, Nash Motors Co.; H. S. Welch, export manager, Studebaker, Pierce-Arrow; Alfred P. Sloan, Jr., president, General Motors Corp.; A. H. Swayne and John T. Smith, vice-presidents, General Motors; Fred J. Fisher, president, Fisher Body Corp.; Frank L. Hambly, export manager, Marmon Motor Car Co.; John McArdle, vice-president, Jordan Motor Car Co.; G. A. Glentworth, export manager, Jordan Motor Car Co.; H. W. Peters, vice-president, Packard Motor Car Co.; B. C. Budd, vice-president and general manager, Packard Motors Export Corp.; J. S. Draper, export manager, Hudson Motor Car Co.; John S. Biggers, Graham-Paige Motors Corp.; R. A. Stranahan, president, Champion Spark Plug; Vincent Bendix, president, Bendix Corp.; E. C. Morse, Chrysler Motors Export Corp.; James Mooney, president, General Motors Export Corp.; Ralph Murphy, general manager, H. H. Franklin Mfg. Co.; D. E. Bates, secretary and treasurer, Reo Motor Car Co.; Fabio Sergardi, designing engineer, Reo Motor Car Co.; William Sparks, Sparks-Withington Co., and Vance C. Hall, export manager, Duesenberg, Inc.

Shaffner is Promoted

W. L. Shaffner, former fleet sales manager for the Oakland Motor Car Co., has been promoted to assistant sales promotion manager, it is announced by W. E. Fellows, assistant general sales manager. He joined Oakland four years ago after an extensive automotive experience which included the managership of the sales development department of General Motors Truck Co.

Adams Heads Advertising

B. D. Adams, formerly sales and advertising manager of the Ryan Aircraft Corp., St. Louis division of the Detroit Aircraft Corp., has been appointed advertising manager of the latter concern under the supervision of L. J. Robinson, sales manager.

Mullins Joins Federal

Leo Mullins has been appointed national division sales manager of the Federal Motor Truck Co., Detroit.

Udell Resigns

A. E. Udell has resigned as purchasing agent of the Oliver Farm Equipment Co., Chicago. His plans for the future have not been announced.



K. T. Keller

whose appointment as vice-president and general manager of all Chrysler divisions was announced recently in AUTOMOTIVE INDUSTRIES

Biddle Joins Oakland

H. J. Biddle, formerly assistant manager of General Motors Export Corp., has been appointed export manager of the Oakland Motor Co., succeeding Cecil Thompson, who has been advanced to an assignment in the domestic sales department.

Calhoun Joins Pittsburgh

T. A. Calhoun, former sales manager of the Triplex Safety Glass Co., is now associated with the Pittsburgh Plate Glass Co., directing the sales of Duplate, shatter-proof plate glass.

Tucker Returns From Trip

R. Ernest Tucker, who is at the head of the sales and service department of the Kinner Airplane & Motor Corp., has returned from a six weeks' trip to the East coast.

Thompson Sails for Europe

R. C. Thompson, export manager of the Prest-O-Lite Storage Battery Sales Corp., sailed recently for a trip through northern Europe in the interests of the company. Prest-O-Lite does an extensive business in overseas markets, including Denmark, Sweden, Norway, Finland, Germany, Holland and Belgium.

Bullivant With Trav-Ler

H. J. Bullivant has been named sales manager of the Trav-Ler Mfg. Corp., St. Louis.

Clark and Bane Appointed to Aviation Corp. Board

Col. V. E. Clark and Col. Thurman H. Bane have been appointed to the board of directors by Aviation Corp. Col. Clark has had long experience in military aviation and has also served General Motors Corp. and as chief engineer of Consolidated Aircraft Corp. Col. Bane also had much military aviation experience and has held many positions in the army air service since the war.

Designer Joins Weymann

A. H. Walker of London, English coach designer and intimately associated with Charles T. Weymann, the inventor, has joined the American division of the Weymann Body Co. at Indianapolis, announces Col. E. S. Gorrell, president of the Stutz Motor Car Co. of America, which absorbs practically all of the output of this concern.

Marmon Names Field Men

R. O. Gresham has been placed in charge of field activities in the states of Iowa, Arkansas, Missouri, Oklahoma, Kansas and Nebraska, with headquarters in Kansas City, Mo., and H. E. Slagle, whose headquarters are in Charlotte, N. C., is now representative.

Fokker to Visit Europe

Anthony H. G. Fokker, designer of Fokker airplanes, sailed last week for a two months' visit to Europe. Most of the time will be spent in visiting the Dutch Fokker plant.

Lucke Joins Maremont

Carl R. Lucke, formerly associated with the American Steel Export Co. and the E. Edelmann Co., has joined the Maremont Mfg. Co., Chicago, manufacturers of automobile springs, as export manager.

Air Associates, Inc., Appointments

Air Associates, Inc., has appointed Donald Fisher, formerly with the Buick division of the General Motors sales organization, in charge of dealer contacts in the mid-western territory, and Hans Hermann, also an automotive salesman, to cover the New York metropolitan customers' list.

Livingston Returns

F. J. Livingston, service manager for the Lycoming Mfg. Co., Williamsport, Penna., an Auburn unit, has just completed a tour of the Middle West States.

Brown is Promoted

A. D. Brown of the Allis-Chalmers Mfg. Co. has been appointed district manager of the Buffalo, N. Y., office to succeed M. W. Phelps, resigned.

Black Bodies in Majority at Olympia; Fabric Types on 32 Per Cent of Cars

LONDON, Oct. 19 (by cable to *Duco Information Service*)—The tendency to brighter colors which seems to be in evidence all over the world is also a noticeable trend at the London International Motor Show which has just opened at the Olympia. Black cars are still in the majority, but instead of being entirely black with a dark interior, they now carry a touch of color, either in the striping or on the wheels. They are also upholstered in light colored leather or fabric. Blues, especially dark blues, are the next most favored color after black. Reds and reddish maroons come third, although they are not as prevalent as last year. These are followed by beige, ivory, green and gray, all pretty close together. At the bottom of the list come browns. Yellows do not seem to be very much in favor. No purple cars are seen.

Green, as in the Paris Salon, is one of the colors that has made the greatest progress not only in the number of cars finished in it, but also in its use as a secondary color and for striping and trimming. Another conspicuous color is ivory, which is used much more here than in Paris. It is considered

very useful as it can be employed with any other color. There are very few cars in two shades of the same color, as the preference here seems to be to use more contrasting colors.

The show here differs from the Paris Salon in the large use of fabric bodies. This amounts to 32 per cent of the cars shown. Paint and varnish are still used but in a small degree as the use of nitrocellulose lacquers is increasing. There are quite a large number of colored fenders, but not as many as in Paris, due probably to the greater prevalence here of black cars. Colored fenders shown are generally in the color of the body, or of a darker color.

There are very few disk wheels, those seen belonging generally to continental cars. Quite a few wooden wheels are on view but the great majority are wire wheels, which are usually black or finished in color. There are very few in white metal. The color of the wire wheels is that of the body or of a contrasting color not always lighter than that of the body, as in Paris. Generally speaking, the color of wire wheels is such as to create contrast with colored fenders.

Govro-Nelson is Bought by Ex-Cell-O Interests

DETROIT, Oct. 23—Acquisition of the Govro-Nelson Co., Detroit, maker of aircraft engine parts, by the Ex-Cell-O Aircraft & Tool Corp., through outright purchase, was announced here by N. A. Woodsworth, president of the latter firm. This is the first step in a large expansion program which Ex-Cell-O has planned, it was stated. Stockholders of the company, at a special meeting this week, voted to increase the authorized no par common stock from 300,000 to 500,000 shares, and in view of the expansion program, voted to waive their preemptive rights to purchase any of the additional stock.

The Govro-Nelson Co. was organized in 1923 to manufacture parts for automobile and airplane engines and to do experimental work for various manufacturers of these engines. It has done also a large business with Diesel engine makers and electric refrigerator manufacturers. Sales of the company for the first seven months of 1929 showed a 400 per cent increase over the same period last year. Its present plant was built in 1927 and 1928. Orders on hand insure capacity operation of this plant for the next eight months, it is announced.

Murray Corp. Production Gains

DETROIT, Oct. 24—The Murray Corp. of America, makers of automobile bodies, will be operating at nearly capacity by Dec. 1 with an output approaching 1500 bodies daily and 800 sets of stamping and woodwork in order

to fulfill business now on the books, according to Arthur P. Dowell, vice-president in charge of manufacturing. The company's newest manufacturing unit, 125 by 400 ft., now under construction, will be completed about Nov. 15.

Plans Set for Aero Show

BALTIMORE, MD., Oct. 24—The First Annual Baltimore Aircraft Show will be held in Fifth Regiment Armory here, from Dec. 9 to 14. The show is the first indoor aeronautical exposition to be staged in this section of the country. Aviation expansion and development programs under way in this territory at present eventually will result in expenditures of \$50,000,000 in factories, airports, aviation equipment and planes.

Haartz Continues Business

CAMBRIDGE, MASS., Oct. 24—John C. Haartz, president of the Haartz Auto Fabric Co., is continuing his business under this name. The concern controls the Haartz-Mason Rubber Mfg. Co. and the Haartz Auto Fabric Co., plush department, both of Watertown, Mass. Mr. Haartz severed his connection with the J. C. Haartz Co., New Haven, in 1924, which was purchased by L. H. Green, of the Automotive Materials Corp., Detroit, as reported in *Automotive Industries* Sept. 14.

Completes Two Hangars

LOS ANGELES, Oct. 24—Two steel hangars, costing approximately \$65,000 each, have just been completed at the "model airport" of the United Aircraft & Transport Corp. at Burbank, Calif.

Production Showing Recession in 1929

First Nine Months' Gain is Cut Into as Decline Becomes Evident

WASHINGTON, Oct. 20—September production (factory sales) in the United States, as reported to the Department of Commerce, amounted to 415,332 motor vehicles, of which 364,786 were passenger cars, 49,681 trucks and 865 taxicabs. The total was an increase of 18 vehicles over that for September last year.

There was an increase of 6171 vehicles in the production of passenger cars last September as compared with the corresponding month of 1928, and an increase of 589 taxicabs, but a decrease of 6742 trucks.

The production by months in 1929 compared with 1928 was stated as follows:

Month	1929 Pass. Cars	Trucks	Taxicabs
January	347,382	*51,591	2064
February	405,708	*58,537	2108
March	513,344	*69,800	2079
April	537,225	*82,436	1686
May	516,055	*86,705	1318
June	*452,598	*91,377	1378
July	*426,137	*73,196	1054
August	*441,942	*55,379	*1040
September	364,786	49,681	865

*Revised.

Month	1928 Pass. Cars	Trucks	Taxicabs
January	205,142	26,082	504
February	290,689	32,645	462
March	371,150	41,493	671
April	364,265	45,227	612
May	375,356	49,920	507
June	356,214	40,174	408
July	338,383	53,294	409
August	400,124	60,705	469
September	358,615	56,423	276
October	339,487	57,138	659
November	216,754	39,686	700
December	204,957	28,123	1036

In the first nine months of this year the total production was 4,637,471 vehicles, compared with 3,470,219 in the corresponding nine months of 1928. The production of passenger cars in the first nine months was 4,005,177, compared with 3,059,938 in the first nine months of 1928; trucks, 618,702, compared with 405,963 in 1928, and taxicabs, 13,592, compared with 4318 in 1928.

Jersey Registrations Gain

NEW YORK, Oct. 22—New passenger car registrations in New Jersey during September totaled 10,473, according to Sherlock & Arnold. This compares with 9772 for September a year ago and brings the total for the first nine months of the year to 106,640, as compared with 89,811 for the corresponding period of 1928.

LaFrance-Foamite Financing

ELMIRA, N. Y., Oct. 24—The most extensive building and alteration program in the history of the American-LaFrance Co. is now being financed by the American-LaFrance & Foamite Corp.

Republic Has New Truck

ALMA, MICH., Oct. 26—The Republic Motor Truck Corp. has announced a new truck, Model D-1, with chassis rated at 9000 lb. gross weight.

Holds Low Landing Speed is Being Over-Emphasized

NEW YORK, Oct. 22—Too much emphasis is placed on low landing speeds in the qualifying requirements of the Daniel Guggenheim Fund's safe aircraft competition, in the opinion of Thomas Huff of Fokker Aircraft Corp., speaking recently before the Metropolitan Section of the Society of Automotive Engineers. This meeting was an aviation meeting and was attended largely by aircraft engineers from various manufacturing units in the territory immediately surrounding New York City.

The prime requisite for commercial production of airplanes, Mr. Huff contended, is speed with load. One of the principal factors apparently sought after in the rules of the contest seems to be low landing speed, and this is impossible to obtain with high wing loading factors which are necessary in order to secure planes which will operate efficiently in commercial activities, said Mr. Huff.

G.M.C. Announces New Truck Body

PONTIAC, MICH., Oct. 24—The General Motors Truck Co. announces a de luxe 9 ft. light-duty panel body for its T-19 chassis. This chassis has a wheelbase of 133½ in. With the new body the truck weighs 4000 lb. and the total gross weight allowance is 6000 lb., giving a load capacity of one ton. Inside dimensions of the body are as follows: Length, 108 in.; width, 51½ in.; height, 55 in.

Studebaker Group Buys Marvin

CHICAGO, Oct. 23—The Studebaker interests of South Bend and Chicago have acquired substantial holdings in the Marvin Radio Tube Corp.

Barclay Wins Race in British Classic

LONDON, Oct. 22—Jack Barclay, driving a Bentley racing automobile, roared over a 500-mile course at Brooklands today and won the Racing Drivers' Club contest with an average speed of 107.31 miles an hour. Second place was won by Clive Dunfee in a Bentley car at an average speed of 105.40 miles an hour, and third place went to Cyril Paul in a Sunbeam, at 102.48 miles an hour.

Cites Export Opportunities

WASHINGTON, Oct. 26—That the Netherland East Indies offer an important and increasing market for the sale of automotive accessories is reflected in the amount of imports during 1928, which totaled approximately \$1,629,570 as compared with \$1,388,890 during 1927, or an increase of 17.3 per cent, according to the Department of Commerce. Imports of automotive accessories into Java and Madura during the past five years, with the exception of 1926, have increased steadily. Estimated automobile registrations on Jan. 1, 1929, were 56,983 passenger cars, 5489 buses and 9720 trucks.

The United States is by far the principal source of supply of the automotive accessories sold in this market.

Maccar Adds Truck

SCRANTON, PA., Oct. 25—The Maccar Corp. has announced the addition of a two-ton, six-cylinder chassis, known as Model 40.

N. S. P. A. Adds to Show Space for Detroit Event

DETROIT, Oct. 22—With demands for exhibition space at the fifth annual N. S. P. A. Show becoming more pressing daily, R. Macfee, secretary, has added another 39 booths to the 311 already available, thus bringing the total to 350 to be occupied by about 225 exhibitors. This means that visitors to the exposition which opens at Convention Hall, Detroit, on Monday, Nov. 1, and closes Friday, Nov. 15, will be confronted with an expanse of displays occupying about 100,000 sq. ft.

Leading manufacturers of the country will exhibit products running the entire gamut of automotive replacement parts, maintenance materials, shop tools and equipment, as well as a variety of aviation products.

Buys Canadian-American

DETROIT, Oct. 22—The Schlee-Brock Aircraft Corp. of Detroit has acquired the Canadian-American Airways, Inc., of Minneapolis, through an exchange of stock on basis of one Schlee-Brock for two Canadian American. The line will have daily service between Minneapolis and Winnipeg. Included in the purchase are 120 acres to be used for flying school.

Hupp Motor Insures Employees

DETROIT, Oct. 22—The Hupp Motor Car Co. has adopted a combined group life and sickness and accident insurance for its 7000 employees.

Makes Battery Per Second

INDIANAPOLIS, IND., Oct. 24—One battery every four seconds—a total of 12,615 batteries in one working day—was the production record recently set up by the Prest-O-Lite Storage battery Corp. at its Indianapolis plant.

Calendar of Coming Events

SHOWS

New York Automobile SalonDec. 1-7
National Power Show, Grand Central Palace, New YorkDec. 2-7
Philadelphia, AutomobileJan. 11-18
Buffalo, AutomobileJan. 11-18
Milwaukee Automobile ShowJan. 11-18
Cincinnati, AutomobileJan. 12-18
Detroit, AutomobileJan. 18-25
Baltimore, AutomobileJan. 18-25
Harrisburg, AutomobileJan. 18-25
Louisville, AutomobileJan. 18-25
Hartford, AutomobileJan. 18-25
Rochester, AutomobileJan. 20-25
Columbus, AutomobileJan. 26-Feb. 1
Wilkes-Barre, AutomobileJan. 27-Feb. 1
Wichita, AutomobileFeb. 3-8
Cumberland, AutomobileFeb. 3-8
Syracuse, AutomobileFeb. 3-8
Peoria, AutomobileFeb. 4-8
St. Louis, AutomobileFeb. 4-9
Denver, AutomobileFeb. 10-15
Providence, AutomobileFeb. 14-22
Camden, N. J., AutomobileFeb. 24-Mar. 1
Des Moines, AutomobileFeb. 24-Mar. 1
Detroit (All-American Aircraft)April 5-13
London, AutomobilesOct. 17-26
Prague, AutomobilesOct. 23-30
Paris, MotorcyclesOct. 23-Nov. 3
M. & E. A. Show and Convention, ChicagoNov. 4-9
N. S. P. A. Show and Convention, DetroitNov. 11-16

London, TrucksNov. 7-16
Paris, TrucksNov. 14-24
London, MotorcyclesNov. 30-Dec. 7
Brussels Auto SalonDec. 7
New York NationalJan. 4-11
Newark (N. J.) Automobile ShowJan. 11-18
Boston Automobile ShowJan. 13-25
Chicago National, ColiseumJan. 25-Feb. 1
Cleveland Automobile ShowJan. 25-Feb. 1

CONVENTIONS

Asbestos Brake Lining Assn., New YorkDec. 11
Ohio Assn. of Commercial Haulers, ClevelandJan. 30-31
National Hardware Association, Atlantic CityOct. 21-24
World Engineering Congress, Tokyo, JapanOct. 29-Nov. 22
Overseas Club Dinner, ChicagoNov. 6
National Automotive Parts Association, DetroitNov. 6-8
National Tire Dealers Assn., ChicagoNov. 11-14
International Acetylene Assn., ChicagoNov. 13-15
National Asso. Finance Companies, ChicagoNov. 19-20
American Society Mechanical Engineers, New YorkDec. 2-6

Highway Research Board, Ninth Annual Meeting, Washington, D. C.Dec. 12-13
National Automobile Dealers Association, New York CityJan. 6
American Roadbuilders Association, Atlantic CityJan. 11-18
American Institute Electrical Engineers, New YorkJan. 27-31
National Automotive Dealers Association, ChicagoJan. 27-28
Southwest Road Show and School, WichitaFeb. 25-28
American Society Mechanical Engineers, Fiftieth Anniversary Celebration: New YorkApril 5
Hoboken, N. J.April 7
Washington, D. C.April 8-9

RACES

Los AngelesNov. 17
S. A. E.
Transportation Meeting, TorontoNov. 12-15
Annual Meeting, DetroitJan. 21-24

SALONS

Hotel Drake, ChicagoNov. 9-16
Hotel Commodore, New York CityDec. 1-7
Hotel Biltmore, Los AngelesFeb. 8-15
Palace Hotel, San Francisco, Feb. 22-Mar. 1